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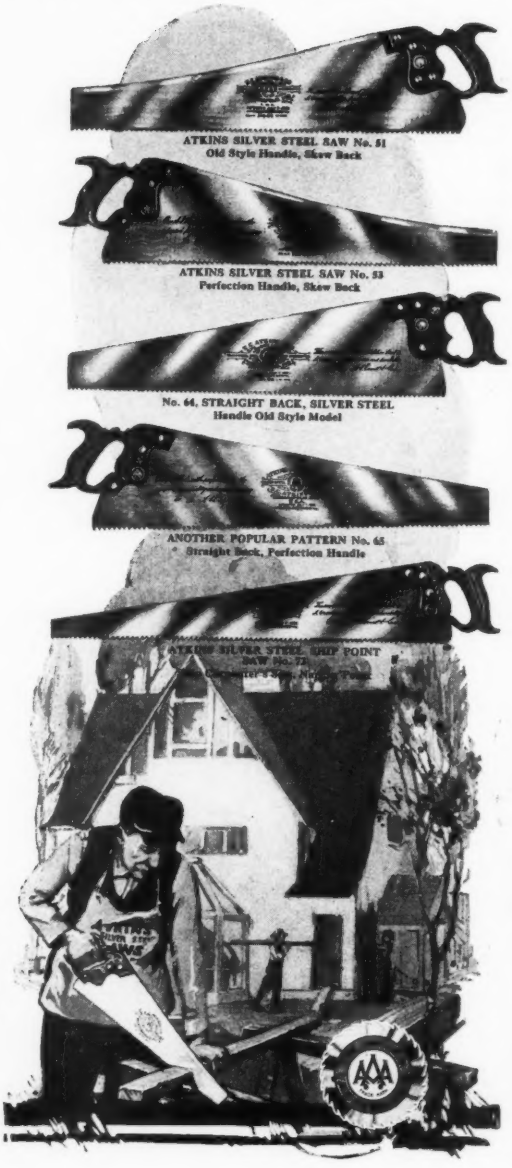
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INDUSTRIAL-ARTS MAGAZINE

Volume XI OCTOBER, 1922 Number 10

Results of an Inquiry Concerning Certain Phases of Industrial Arts for Junior High School. --II.

Kenneth V. Carman, Columbia University, New York City

Outstanding Preferences Briefed.

IN summarizing the results of the inquiry concerning certain phases of junior-high-school industrial arts certain outstanding preferences are apparent. In regard to aims or objectives of junior-high-school industrial arts, there was a decided preference for the following statement of aims: *"The purpose of the work in these years may be stated as including values for increased practical efficiency and more intelligent citizenship; trying out of vocational guidance values; and values in concrete experience giving motive for and interest in the subjects related to wider vocational and social interest. * * * To these may be added the specific training values for those who will enter industrial vocations. * * * Here, as in the elementary school, industrial intelligence, insight and appreciation constitute the largest values, and these should not be subordinated to the mere manipulation of tools."*

There was also a decided preference for the one room, many activities, diversified shop for the small communities up to 15,000, but the preference was reversed for the large cities where the separate shops idea was just as decidedly preferred.

The conclusions are that those answering the questionnaire would desire a gradual changing from the one shop idea as the communities become larger until in the very large cities the preference for separate, more specialized shops, is marked.

A substantial majority favored a course of study whereby pupils would be required to take certain definite work for a definite period, etc.

Industrial-arts work should be required of all junior high school boys in the seventh year with a gradual but not decided tendency toward elective work in the eighth and ninth years.

Twenty seems to be the number of boys one teacher can handle in one shop in which a number of activities are carried on.

NOTE:—The first part of this inquiry was published July, 1922, page 251.—Ed.

Discussion.

The results of the questionnaire are valuable in that they indicate opinions from a representative number of educators engaged in industrial-arts work.

While expediency in the practical working out of schedules, programs and courses of study to accommodate pupils under existing conditions is to be expected, it is, nevertheless, evident that there is a lack of proper consideration for the pupils themselves.

Because of attention being, perhaps, necessarily focused on immediate problems of organization, principals and teachers have not had time to fully appreciate the large social values, individual differences, the psychology of adolescent youth, and the future vocational needs of children of junior high school age.

It is true that many of those actually engaged in this phase of school work fully appreciate the changing conceptions of these present-day needs of children of this age, but traditional influences of an antiquated philosophy, and pressing problems of routine have hindered progress in adapting school procedure to these recognized needs.

It is, however, encouraging to note the appreciation on the part of a substantial majority of the newer conceptions and larger values of industrial-arts work indicated in the selection of aims or objectives. The excerpts chosen as representing more nearly the true functions of this phase of school work, are those which in varying degrees tend to exemplify present-day social and individual needs. While it is to be expected that some persons engaged in the work would still cling to antiquated purposes, the results of the questionnaire clearly indicate that there is throughout the country a majority of persons who favor a more democratic conception of the functions of industrial arts for the junior high school period. It is, therefore, apparent that tradition, existing unfavorable conditions, lack of the right kind of teachers, and lack of initiative are among the most important reasons for not putting into effect a recognized philosophy for this important phase of education. In short, a majority say "we recognize

the need for reorganization, we know what we want but we must meet conditions as we find them," or as Briggs points out the usual excuse is "we haven't got around to that (meaning changes) yet." * * * "It is safe to say that almost without exception they are in varying degrees dissatisfied, but that they either lack vision, a definiteness of purpose, or the energy to initiate changes."

If our purpose is to give to each child a more democratic education, based on up-to-date social needs and inherent individual needs and differences, then we must attempt to organize our school procedure to meet these needs, and strive to adjust school buildings, and programs, and secure adequately trained teachers to give to every child the education "for which by inheritance he is best fitted."

The separate shop idea makes its appeal, in part, on the ground of better "organization and specialization," but it is in danger of the influence of traditional classroom procedure, going through formal required courses in a specified time. It is true that certain schools by requiring intensive short unit courses in the separate shops, attempt to explore aptitudes and interests in this way. In varying degrees a few schools have approximated desirable results. However well organized these schools may be, in practice the scheme is apt to smack of too much emphasis being placed on school organization and specialization of the strict and specific vocational preparation kind.

Influences of the highly specialized vocational educational movement from above and traditional schoolroom formality from below are evident. Many of these "separate shop courses" have for their predominant purpose vocational guidance values. They contend that by "trying out and sampling" of typical industrial occupations the boy may better choose his vocation or be better prepared to enter upon a choice of specific vocational training. This plan and practice to which so many prescribe and which seems so feasible and logical and lends itself so readily to organization has made a strong appeal to administrators and teachers. The work has often been called prevocational and the paramount and common purpose is "getting ready" by "try-outs" for one of the sampled industrial vocations or intensified vocational courses to follow. Let us grant at the outset that for a few even specific vocational training may be offered in the junior high school period, if it is evident that certain individuals are about to leave school.

But for the *majority* of boys are we realizing to the fullest extent our purposes, aims or objectives most effectively when we put our *major* emphasis in these years on vocational finding courses?

For those giving the phase of school work serious study, the relative degree of importance of vocational guidance or exploration aims to the larger general educational objectives may vary. It is believed that vocational guidance values should not constitute the primary aim of this work.

Industrial arts should be offered with the major interest on general educational values. Rather than put emphasis on the varying uncertainties of the possibility of choosing a vocation, we may realize values which if examined appear more applicable to life after school. By working in various industrial activities, studying conditions of workers in industry, every boy regardless of his future vocation may get an insight into and an appreciation of industry and industrial workers making for better citizenship and associations. The future capitalist will profit by an increased sympathy with conditions of labor, appreciate the cultural possibilities in hand work, and create an interest and responsibility for the worker and conditions in which he works. For the boy who will enter industry as a worker, there will be opportunities to appreciate conditions, making him a more intelligent voter and citizen. He will be more intelligently prepared to participate in needed legislation and reform, come nearer to a sympathetic understanding of the part he has to play in association with his employer, create a more scientific and thoughtful attitude toward his work, and recognize cultural and artistic values as a producer and consumer.

Education through the industrial arts, therefore, will not limit itself to man's *working* hours alone, but provide for a better and more intelligent use of his *leisure*.

The safest way, then, would be to build a junior-high-school industrial arts program on a *general education* foundation. All the inherent vocational guidance values which are possible will not be diminished but will follow or be a part of a program preeminently that of general education.

A SUGGESTED POLICY FOR JUNIOR-HIGH-SCHOOL INDUSTRIAL ARTS BASED ON DEDUCTIONS RESULTING OF THE INQUIRY.

Purposes of the Work—Aims or Objectives.

Supervisors and instructors should first have definite aims, objectives, purposes, or values to be sought.

General educational values, regardless of future vocational status.

Industrial intelligence, insight and appreciation.

Intelligent citizenship.

More practical efficiency, manipulative, and concrete experiences in shop work manipulation in construction giving motives for and interests in subjects related to wider vocational and social interests.

Vocational guidance values.

Exploration.

Vocational education for the necessary few.

Types of Shops.

The question whether or not there should be one shop in which all phases of industrial work is carried on, regardless of the size of the community or whether separate shops should be favored, has been a matter of contention.

In the light of the best educational theories, based on a sound philosophy, certain leaders in this phase of school work have advocated one large shop where boys of adolescent age may develop natural attitudes, aptitudes, and interests by practical experiences, in a *variety* of manual activities. It has been contended that such a shop best provided the opportunity for values in appreciation of industry and industrial conditions, vocational exploration values, and a more practical efficiency could be realized.

The question of the one room composite shop idea in small communities has not been a matter of very serious contention. In fact, the one shop plan in small communities is the only practical alternative since the number of boys taking industrial arts makes unnecessarily expensive the use of more than one shop, the only question arising being whether or not the work should be confined to one activity, for example, woodwork. Since it is generally accepted that the boy should have a varied experience in some form of differentiated industrial arts work, the one room "diversified," "many activities" or "composite" shop, with little variation may be said to be the solution for the small communities up to about 15,000 population.

Proposal for Junior High School Industrial Arts Shops in Larger Cities.

There are certain advantages and disadvantages of both the separate specialized shop and the one room "composite" shop. Out of 150 opinions received from a representative group of industrial arts men from 43 different states the most common objections and approval on the point were noted and listed. If these consensus of opinions are carefully studied, have we not a basis for better planning the type of shops for the larger cities?

It should be the aim, in so far as possible, to realize as many of the advantages and to eliminate the disadvantages.

Those favoring the separate shop and those favoring the one large diversified shop mention some advantages: some of these may overlap or be in part a repetition, while some may be questioned by the reader. However, they should be helpful in considering and devising the most desirable scheme for arrangement of junior-high-school industrial arts for the larger communities.

Advantages of the Separate Shop.

1. More systematic procedure of work.
2. Better organization; less confusion.
3. Teachers more easily obtained.
4. Instructor who knows his work thoroughly may be had.
5. Departmental teaching.
6. Better discipline.
7. Can be more closely coordinated with the other departments of the school.
8. Gives greater opportunity for vocational training values.
9. More skill.
10. Large industrial insight and appreciation.
11. Allows greater supervision of work of pupil by instructor.
12. No waste of time by boys.
13. Greater industrial insight.
14. More like the industries outside of school.
15. Trade can be better taught; more boys handled at one time.

Advantages of the Diversified Shop.

1. Project method carried out better.
2. No loss of time or gap in the completion of project in more than one material.
3. Allows carrying out of project with diversified work.
4. Better opportunity for pupil to find his own interests and aptitudes.
5. Opportunity for observation of many other activities.
6. Provides for individual differences.
7. More freedom of choice.
8. Boy relies on his own initiative; develops greater interest.
9. Opens up field for future inquiry in the field that the boy is particularly interested in.
10. Allows for selection of leaders to different groups.
11. Economy of teachers.
12. Less money needed for equipment.
13. Law of interest can be better observed.
14. Boy can be better taught.

Disadvantages of Separate Shop.

1. Less freedom in the choice of the project.
2. Less opportunity for observation.
3. If not safeguarded it is apt to put the trade first and the child second.
4. Liable to be too much mechanical training.
5. Boy must adapt himself to work instead of having work adapted for the boy.
6. Less opportunities to find own interests and aptitudes.
7. Gap in the completion of a project made of several materials.
8. Limits field of information to certain industries.
9. Scope of shop becomes limited.
15. Teachers may be too technical and shoppish.
16. Requires more specialized teachers for each line of work.
17. Requires more elaborate material than diversified.
18. Too much room required; more teachers needed.
19. Lack of social interview; lacks the law of interest.

20. Trade teachers often do not understand boys and their desires.

21. Too expensive to have separate shops and teachers in small schools.

Disadvantages of Diversified Shop.

1. Properly equipped instructors are not available.
2. Lack of organization.
3. Distracting influences are increased.
4. One teacher cannot teach several things well.
5. Discipline is made more difficult.
6. Large classes cannot be handled; smaller number of boys under one teacher.
7. Only the high parts are touched in each branch of work.
8. Higher salaries must be paid teachers who can teach different subjects.
9. Impossible to get some of the "old timers" to realize the value of this type of shop.
10. Less individual attention can be given the pupil.

Some of the outstanding advantages of the composite or diversified shop are the carrying out of the project method, with its values of interest and that it is more adjustable to individual differences in this way. Some of the outstanding advantages of the separate specialized shops are, that there is less confusion, more systematic procedure, and that the teacher who can teach one activity well can be more easily secured.

It is believed that for new schools planning floor space for appropriate industrial-arts work, all the advantages of both types of shops can be closely approximated. For existing schools modifications might be made to approximate as closely as possible these desirable advantages. Since existing schools which architectural limitations vary so widely it is thought best to suggest a plan of a typical arrangement where present conditions do not limit the carrying out of the most desirable aims or objectives.

Let us assume, for example, a junior high school where there are approximately 120 boys in the industrial-arts shop at one time, allowing 24 boys to each teacher (five teachers). The shop or shops can be so organized that it resembles the one large diversified shop, only there is a more distinct division of activities. Five major divisions of work may be carried on and each by a teacher who is particularly qualified. All the activities suggested for the one composite shop for the small community may be offered but with more elaborate equipment for specialization if necessary. The departments may center around—

1. Electricity and applied sciences.
2. Metal and related work.
3. Printing.
4. Woodwork and related activities.
5. The fifth shop could either be a *composite* shop for seventh grade boys, as:

A. Elementary work in many activities, including some of those mentioned above and photography, vulcanizing, etc., or,

B. A shop for the buildings trades—carpentry, concrete work, interior wiring, painting, plumbing, etc., or,

C. Automobile work, steam and gas engine work, airplanes, etc.

The division of activities, as indicated above in these departments, may vary, but the outstanding features would be to—

1. Have five departments each in charge of a teacher, with 24 boys, for whom he is responsible.

2. Have partitions approximately three feet high so that all shops are visible to all others, thus making *observation* possible. Glass partitions may extend to the ceiling where necessary, as for example, the print shop could be "glassed in."

3. Allow for inter-shop travel, making possible the availability of all equipment in all departments whenever necessary. (For example, a boy may be interested in a project requiring for its completion work in two or more departments. With the consent of the instructor and by some system of checking in or out of his "home" shop he may make use of the advantages of a more specialized teacher and equipment.)

4. Have (a) one of these five teachers a supervisor who appreciates the aims or objectives clearly and understands boys' individual and social needs and who can coordinate the various departments, or (b) the city supervisor may supervise the carrying out of desirable objectives. Teachers may be brought together by the supervisor so that all will be working for a program designed for fullest realization of up-to-date ideals in education for boys of junior high school age.

6. A certain minimum requirement in each department would make possible some systematic experience in all activities of fundamental or general importance.

7. Ample time and opportunity should be left for the boys' own choosing of projects. If a boy desires, the minimum essentials can be extended to include advance projects making for a well-rounded course if desirable, in the "home" department, where the boy is at that time located.

Special arrangements should be possible for the exceptional boy who desires to take intensive specialized work in any one department whenever it is certain that such vocational training is advisable. In general, differentiation on the basis of individual needs due to varying economic conditions, aptitudes and interests should make for the desirable democratic aims and tendencies of the junior high school period.

Each group of boys could change "home" departments each half year, allowing election of home department the second half of the ninth year, somewhat as follows:

Year	1st Term	2nd Term
7th	Composite shop	Woodwork
8th	Printing	Electricity
9th	Metal	Elective

Type of Shops for the Smaller Communities.

The one-room industrial-arts shop for the small community should be equipped with a large variety so that within reasonable limits a boy could construct and project involving work in varied lines. Benches, one or two speed lathes, and a variety of tools for working in wood. A forge, a light machine lathe if possible, and inexpensive equipment for sheet metal, a printing department, electrical department, a moulding bench and necessary tools, flasks, etc., concrete work, while other departments could provide for photography, motion picture study, vulcanizing and other rubber work, gas and steam engine work, automobile study, and equipment for the construction of science projects.

In addition to the necessary tools a very important part of the equipment would be the printed, mimeographed, and other forms of instruction sheets; blueprints and a shop library of helpful books, magazines, and pamphlets on the various phases of industrial arts projects; an indexed file of drawings and instruction material covering a wide range of projects of interest to boys. The industrial arts teacher should make it a point to gather drawings of projects from every available source. If a boy is interested in making, for example, a wireless set, he should be able to find abundant helps in the form of drawings, clippings and printed matter so that he may "go ahead" with little, if any, help from the teacher.

In a one-room, many-activities-shop all devices for lessening the teacher's individual instruction should be sought. If a boy is especially informed and capable along a certain line he may be employed to assist other boys who are interested in his specialty. It is believed that the diversified shop can be so organized and equipped that a boy may help himself to a maximum degree with the minimum assistance from the teacher. By the full use of instruction sheets, blueprints, reading material, and other devices, a boy may select from a wide range of projects requiring only stimulation, advice and occasional assistance from the instructor. Repair work could be done in the diversified shop as well as the original construction. If possible, a *motion picture machine* would be especially valuable in this type of shop. It could be used to take the place of impossible trips to factories or inconvenient visits to various industrial plants. Since industrial intelligence and insight constitute important objectives, these industries can be projected upon the screen. Practically all important industries and other agencies have reels which can be borrowed without charge or for a small fee. Then, too, since the motion picture industry has become so important, the study of this industry by readings, reports, and observation may center around this important device of the industry—the projection machine. A study of its mechanism, etc., opens up a vast field of valuable inquiry. As in other activities or industries represented, the English department may cooperate in preparing reports to be read before the class.

Methods.

Not any one method will be used in accomplishing or putting into effect our objectives. The project method, however, lends itself better for a major portion of work. When a project is selected which holds the interest of boys of the adolescent age, which is thought provoking and which opens up a large field of future inquiry, we have an opportunity for realizing most of the larger values in industrial arts work.

By the project method individual boys may advance or specialize according to individual ability and needs.

Sometime, however, may well be given over to the cooperative or factory method. Conditions and methods employed in large scale production can be epitomized by having boys organized with a foreman, detail workers, etc., in getting out articles in quantity production. For example, a quantity order of certain school furniture or the printing of a school paper.

Procedure.

First, designing and actual manipulation in construction; Second, readings; Third, visits; Fourth, reports.

First, the boy selects a project with the advice and consent of the instructor. If there is designing to be done, it should be given appropriate consideration since the appreciation of design is an important phase of industrial arts. A drawing should be made but the emphasis will not be on technique, but rather a drawing as well done as possible and which can be used as a working drawing. Ruled or squared paper may be used to advantage, thus making possible a drawing to scale.

In the actual construction involving manipulation, the procedure necessarily differs with each project. In general it is sufficient to say that the shop be equipped with the necessary tools in great variety for the boy to use in completing the project. At the most appropriate time should come the readings, visits, and reports.

Printed material, references, etc., should be available in the shop or listed to be secured elsewhere. References which assist the boy in constructing the project, or which open up further information along the line he is interested. The important study of how things are made in actual industry, the wages paid, opportunities and other vocational information. This will have a value regardless of the future vocational status of the boy and may be of direct vocational guidance value.

Visits to factories or shops where large scale production is carried on along the lines of the project in which the boy is interested, will tend to tie up school work with actual everyday conditions in industry. Reports may be read before the class on individual or collective visits.

Reproducing Antique Furniture in the School

Herman Hjorth, Director of Technical Work, San Juan, Porto Rico.

CHESTS OF DRAWERS.

FROM the earliest times to the present day, a chest of some form seems to have been a staple article of furniture. It has served various purposes, it has been the prototype of several distinct articles of furniture, it has undergone numerous changes in shape and design according to the needs of man and the dictates of fashion, and it has been known by different names, but it has always had a place in the household, often an important and treasured one.

In the Seventeenth Century, chests were used not only for the safe keeping of valuables, but also as a seat and sometimes as a table. A chest was a boxlike structure with a lid opening upwards. Large chests were always strongly made, frequently massive and cumbersome, sometimes elaborately carved or panelled, and generally provided with strong wrought iron hinges and one or more formidable looking locks. Such chests were called "Coffers." The "Dower Chests" containing the dowry of the young bride were of this kind—surely an important and cherished possession in the new home.

FIG. 21.

Smaller chests were made on the same principle and used for the safe keeping of jewelry and other small articles of value. The Guilds also used them for the storage of their documents and a silver drinking cup used on festive occasions when new members were admitted. Such chests were called "Caskets." The one illustrated here (Fig 21) belonged to the cabinet-makers guild in Roskilde, a small town near Copenhagen, Denmark, and is now kept in the old city-hall of that city.

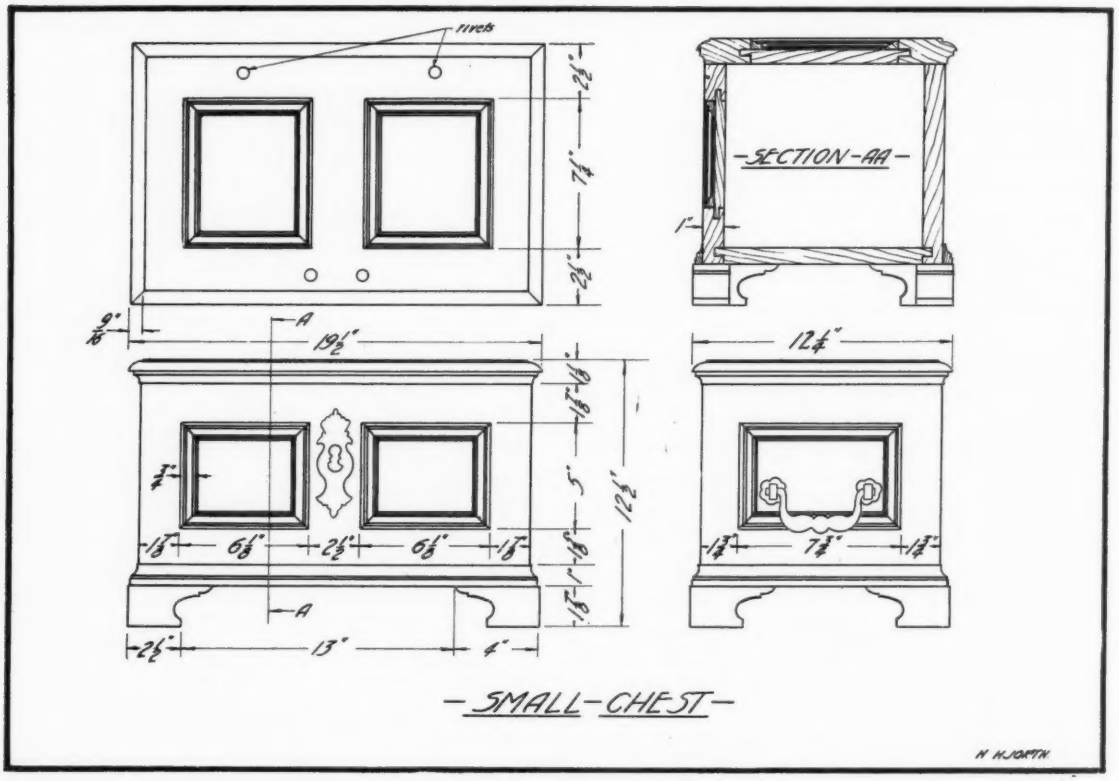


FIG. 21a—DETAILS OF SMALL CHEST.

"Hutches" were chests with doors in front and a fixed top. Later on one or more drawers were added at the bottom, until chests gradually became all drawers, and as such were called "Chests of Drawers."

are often found in fine residences and used for the keeping of logs for the open fireplace.

During the William and Mary Period (1688-1702) and the Queen Anne Period (1702-1750) these chests

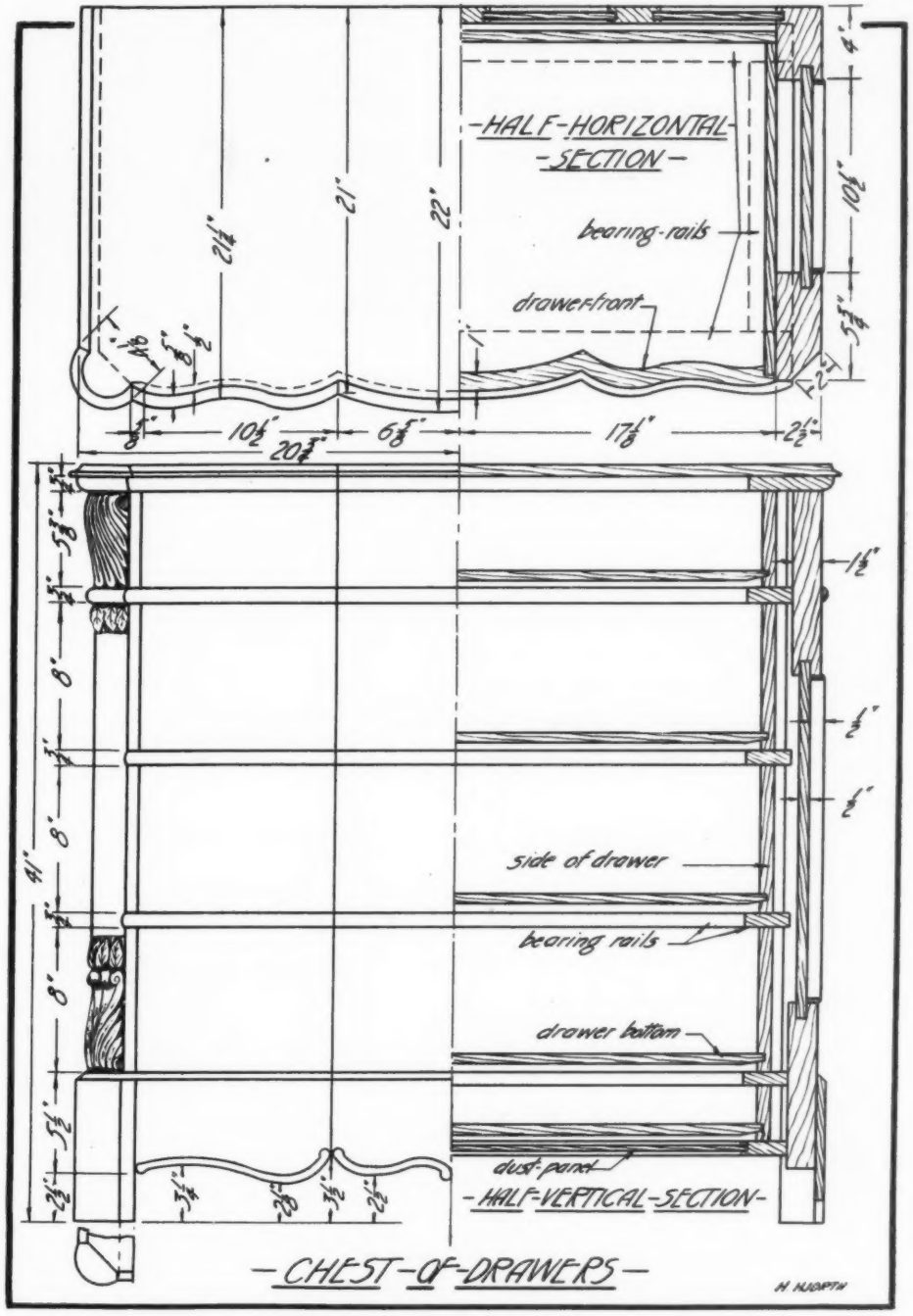


FIG. 22a. DETAILS OF CHEST, FIG. 22.

Chests in the original boxlike form continued to be made, however, and are still being made, now principally of Cedar and for the purpose of storing clothes. Antique chests like Fig. 15, but of larger dimensions, of drawers were made both in one and two sections. During these periods the famous "Lowboys" and "Highboys," which are simply chests of drawers respectively in one and two sections, were also developed. The one

FIG. 22.

section chests of drawers were used as dressing tables and were later on called "Commodes" by Chippendale, Heppelwhite, Sheraton, and their contemporaries.

During the 18th Century chests of drawers were also constructed with a slanting top, which could be opened up and used for writing. Such chests were called "Bureaux," and are still called so in England,, while in the United States they are now known as "Writing Desks." "Bureau" in United States has come

FIG. 23.

to mean a low chest of drawers, principally used for toilet purposes, and it is this piece of furniture evolved from the ancient chest that is to be described in this article.

The chest of drawers, Fig. 22a and 22b is of the block front type that was the style in the latter half of the 18th Century. It is very much easier to make such a chest today than it was at the time when this was originally made, as the drawers* now can be sawed out on a band saw instead of by hand with a turning saw.

*For drawer construction see Industrial Arts Magazine, April, 1922, pp. 142-43.

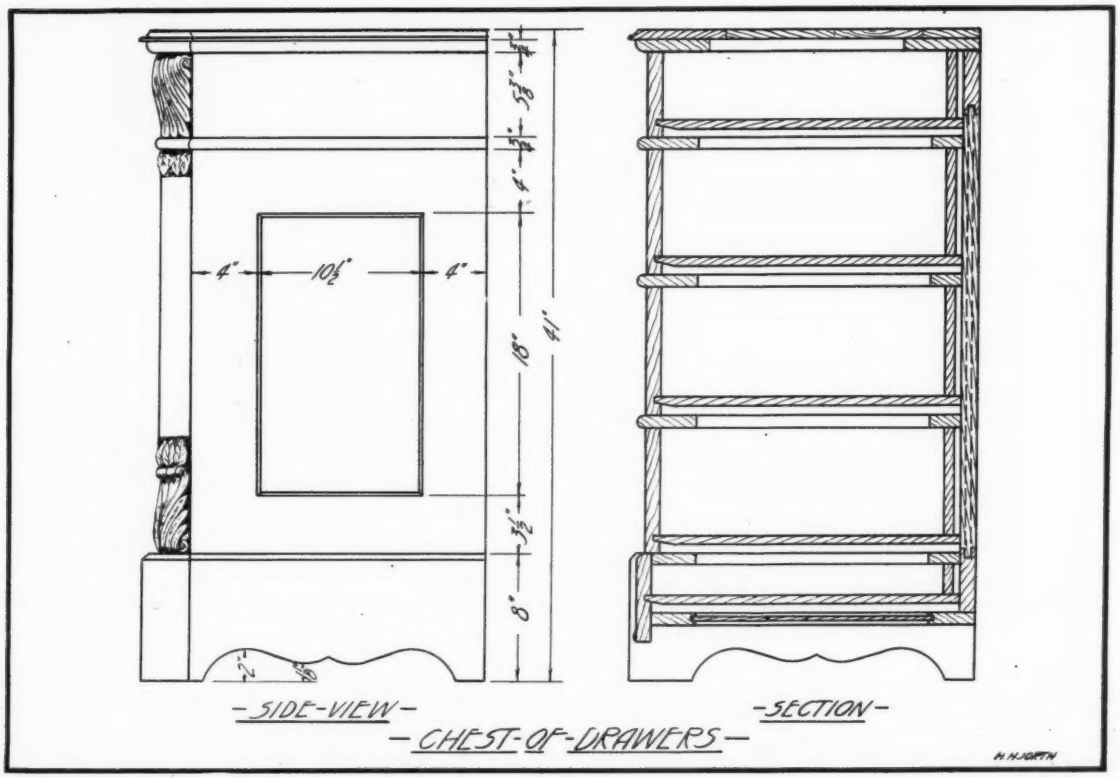


FIG. 22b.

The bearing rails for each drawer consist of four pieces joined to form a frame, which is notched into the four heavy pieces at the corners. The bearing rails for the lower drawer have been provided with a dust panel, which not only keeps dust from entering the drawers, but also keeps them free from roaches and other pests. The carving on the posts and around the keyholes may be procured in composition from Jacobsen & Co., 241 East 44th Street, New York City. This composition is excellently made and thoroughly to be recommended. It may be stained to match any wood. Instead of carving, the half round column at the bottom of the front legs may be extended to the top.

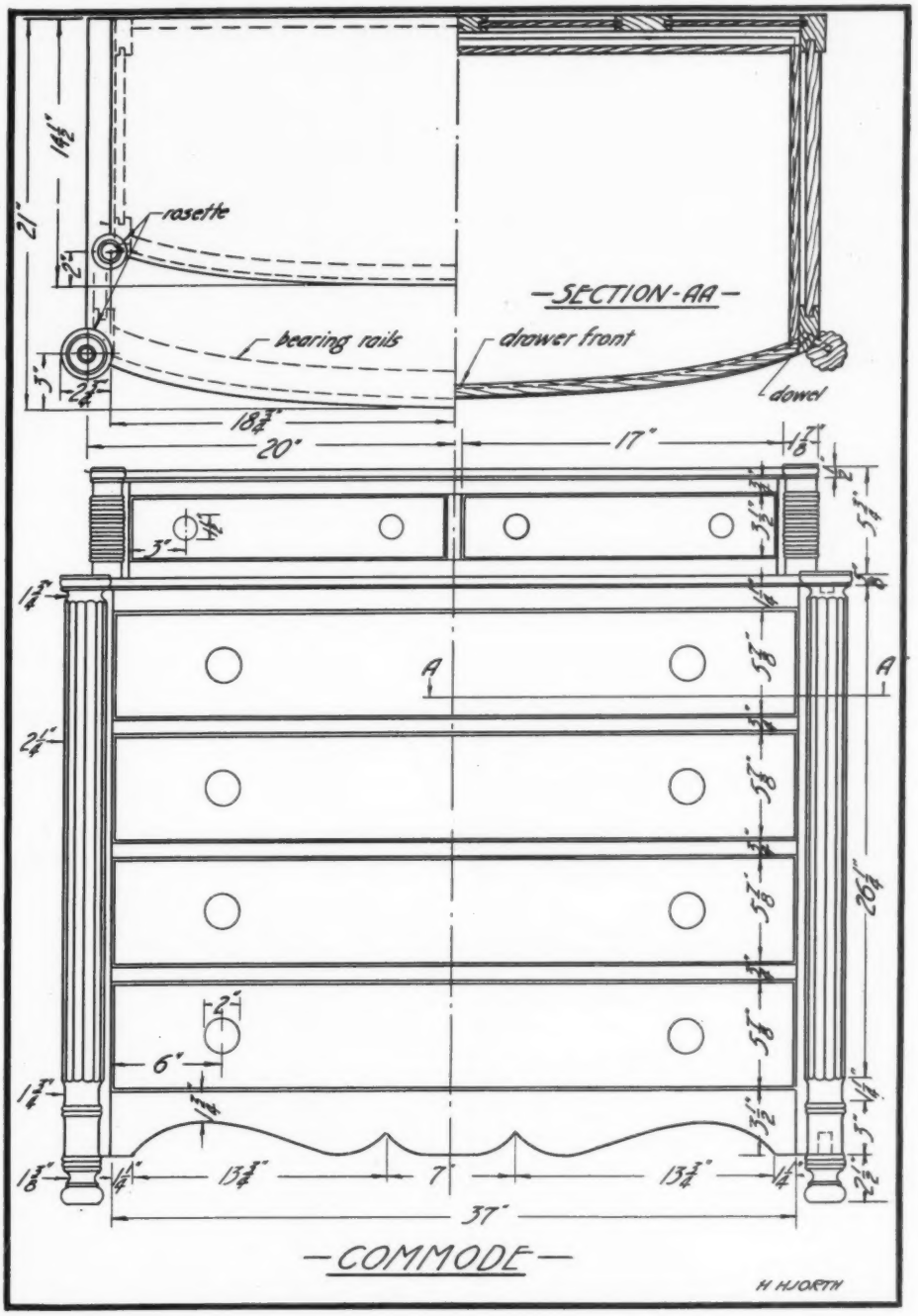


FIG. 23a.

The Commode or Bureau, Fig. 23, is typical of the Sheraton style of design and dates back to the beginning of the 19th Century. The chief difficulty presented in the construction of this piece of furniture is the legs. The rosettes at the top and the feet at the bottom are

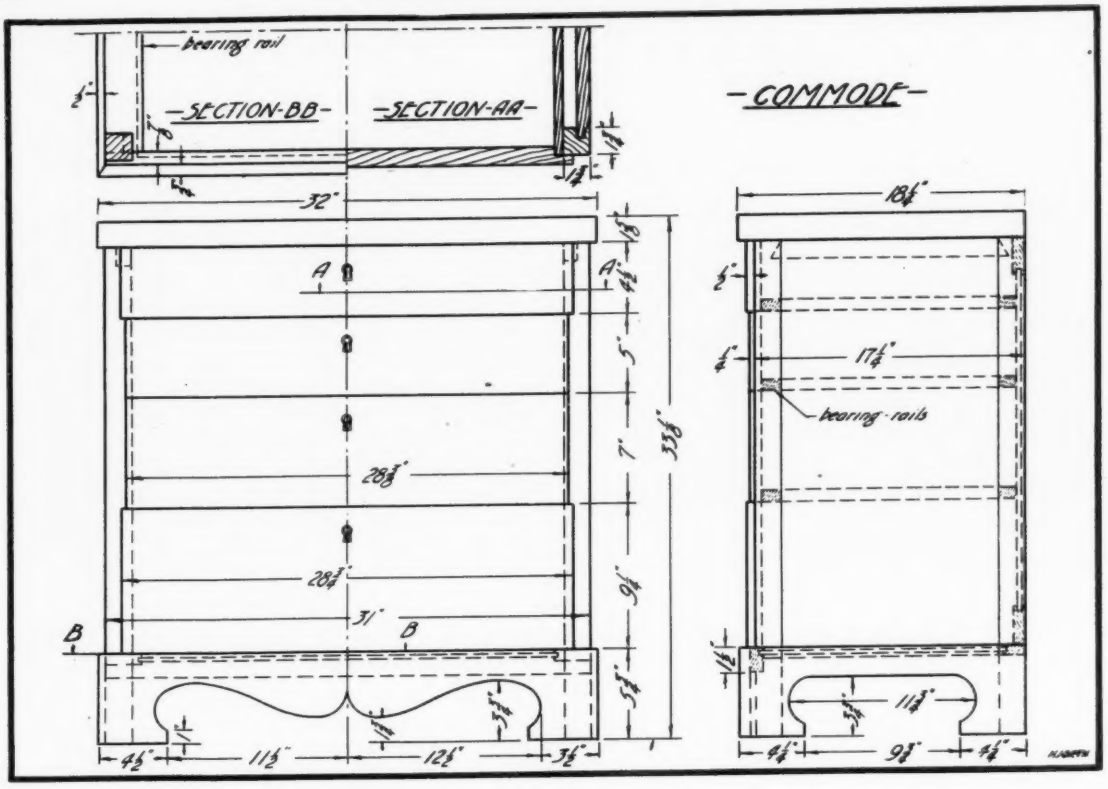


FIG. 24a.

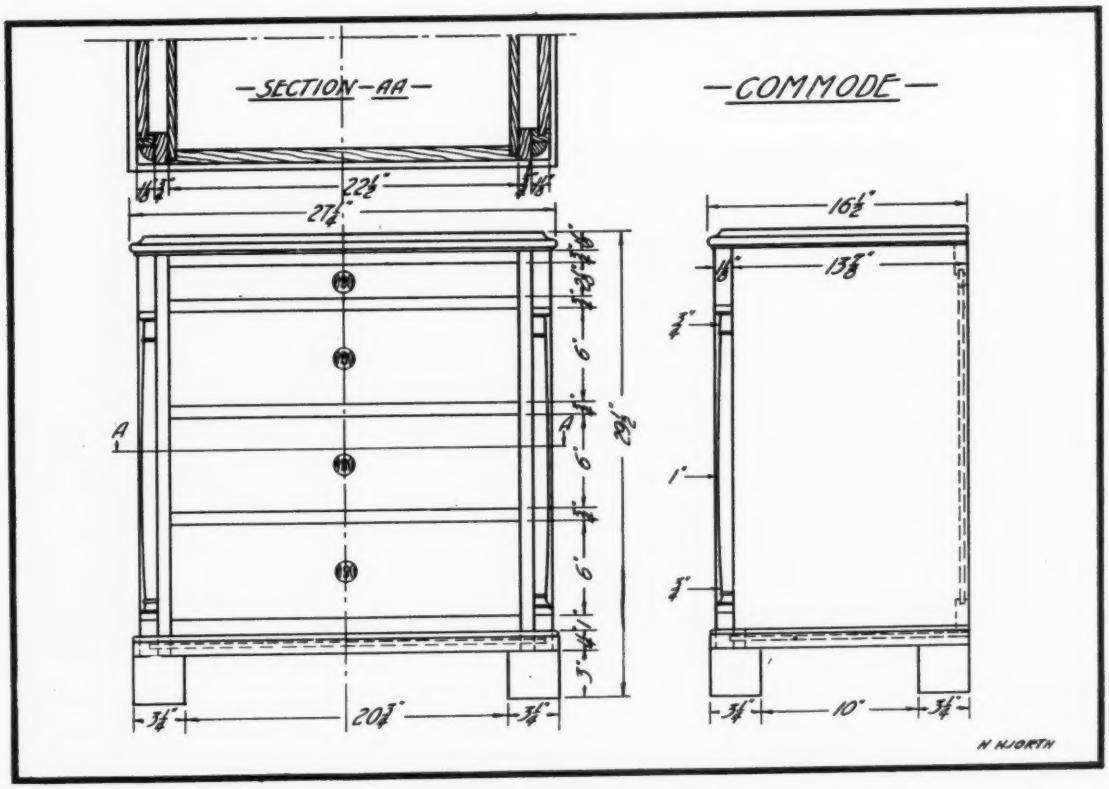


FIG. 25a.

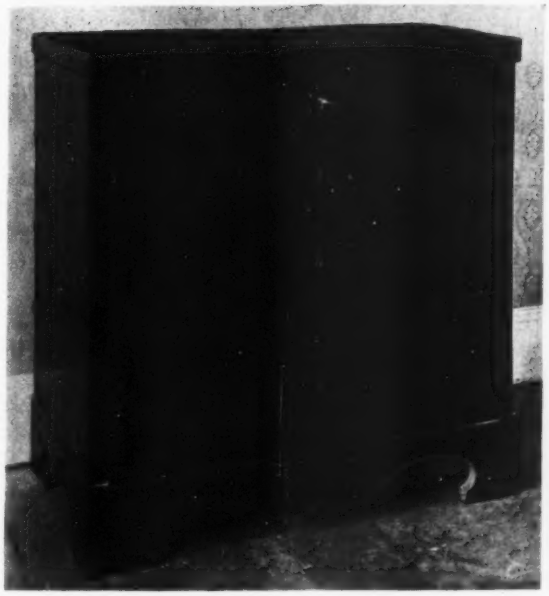


FIG. 24.

FIG. 27.

turned separately and readed as explained in the January, 1922, issue, pp. 14. It is then flattened on one side, either by a hand plane or on a jointer until the width of the flattened piece coincides with the corner planed off the front leg. It is then doweled and glued in place. Wedge shaped blocks will have to be cut and placed in the drawer openings during the gluing process so as to provide a good hold for the handscrews. The rosettes and feet are then glued in place and the top cut at the corners to fit snugly against the rosettes.

The small section with the two drawers on top is constructed in the same way. It is removable. The drawer pulls are turned of wood, but they should be of brass in order to conform to the Sheraton Period (1780-1806).

Fig. 24 is a Commode of the Empire Period (1793-1830) of very simple lines and construction. It will be noticed on the drawing that the four legs are extended right to the floor, that the bearing rails are notched into them and that a dust panel is framed into the lower bearing rail. The base simply consists of three boards mitered at the corners and glued to the legs.

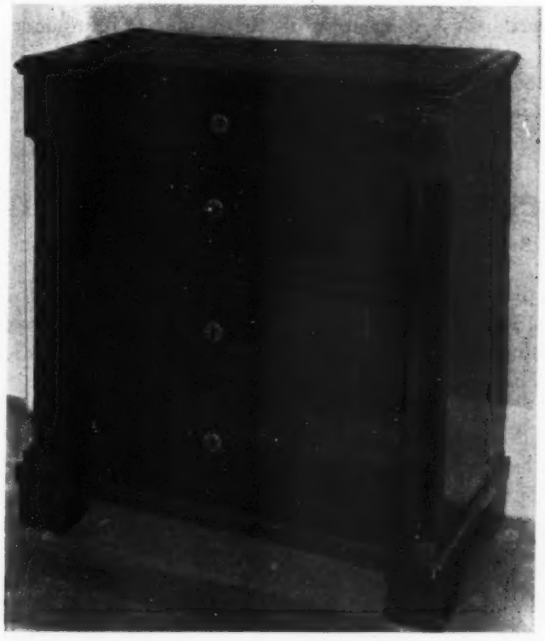


FIG. 25.

The Commode illustrated in Fig. 25 also belongs to the Empire Period and is very simple in construction. The quarter section columns may be turned in the following manner. Square up four pieces of wood (1⅛" Square) cutting them longer than they need to be when finished. Clamp them together as illustrated in Fig. 26a and turn them in the lathe. Please note that the thickness dimensions given in the drawing apply to a quarter section only and therefore must be doubled. In other words, the dimensions given on the drawing denote the length of the radii only, while in

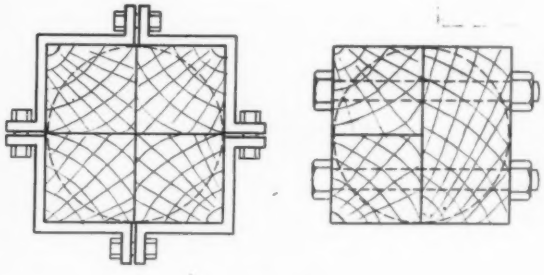


FIG. 26b.

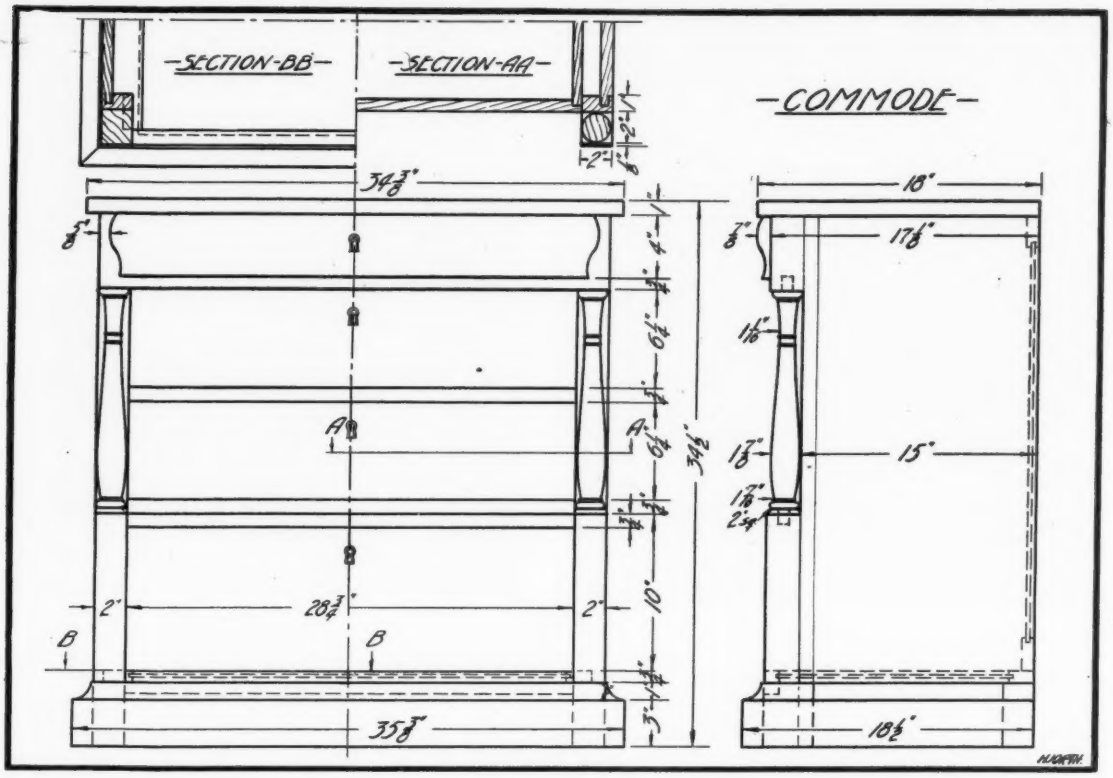


FIG. 27a.

turning the four pieces together, the diameters are the distances to be measured. As only two quarter sections are needed, the method Fig. 26b may be used as an alternate.

The square blocks used for feet look rather clumsy and might well be modified to more graceful lines and proportions.

Another example of the Empire Period is the Commode illustrated in Fig. 27. It will be seen from the drawing that the turned column is fixed between the two square pieces at top and bottom, which in turn are glued to a piece 1" thick by 2" wide by 33½" long (Section AA). The construction at the base is similar to the one described in Fig. 24. The top drawer has a shaped front. The shaping must be done by means of molding planes, scrapers and sandpaper. A template should be made and used freely while the planing is being done.

The escutcheons shown on the photograph are not the original ones and not appropriate for this piece of furniture.

Cement Work as a Therapeutic Occupation for Men[1]

Louis J. Haas, Director of Therapeutic Occupations, Bloomingdale Hospital, White Plains, New York

THE therapeutic use of occupation was well understood by workers in certain hospitals in this country, long before its use in military hospitals during the late war brought this science to the attention of the public. Some crafts are used in their pure traditional form, but others have had to be modified, and in some cases difficult processes of construction completely eliminated, to meet the needs of the individuals to be treated. The therapeutic value of the work treatment to the patient certainly justifies the taking of such liberties with what is considered correct constructional methods. In these efforts to meet an emergency, certain crafts seem almost to have been modified without the discretion which experience now indicates.

One of these crafts, cement work, has been so simplified in an effort to meet the needs of certain patients, that its results may be confused with small pottery. Small quantities of certain cement mixtures to which very little water has been added are tamped into iron moulds which produce small bowls, vases, flower-pots, window boxes and bird baths. This technic is well within the ability of most convalescent patients. The dust which arises when the cement is mixed within

[1]The suggestions in this paper are especially useful for school shop use.—Ed.

doors is often objectionable and to some cases would be harmful. Much thought has been given to the ways and means of eliminating the dust without success, because the mixture cannot contain sufficient moisture to make possible the use of any form of tumbler.

The finished piece of work is easily and quickly produced by this method and interests the patient, and unquestionably has a therapeutic value, but there are the following disadvantages. The finished pieces accumulate very rapidly, the monotonous sameness which the iron moulds produce, make the articles of little value, and the local need for such things is very soon supplied. What to do with the product soon becomes a grave question. The way out is originality, individual designs, but the iron mould does not lend itself to this type of product.

While this kind of cement work has been developed, another form has been almost wholly overlooked. This involves the production of larger pieces, planned to meet local needs which also sustain attention, appealing to patients as worthy of production, by men who have been doing men's tasks. This type of cement work meets the needs of quite another class of patients, men who in spite of their illness, physical or mental handicaps, require employment which utilizes physical strength.

The writer and Mr. Russell Bird, who assisted him to develop this phase of cement work, aiding also in the preparation of this paper, found that the beautifying of the hospital grounds was a fertile source of inspiration, and made possible the transition from small flower-pots, to larger and more useful articles. The first piece undertaken was a small bench of cement. In designing and producing this piece, every form of difficulty met with, and the solution found, was noted, that this experience might aid in the designing and making of

PLATE 1a. CONCRETE BENCH.

other projects. Several of these problems or projects are here presented in the hope that some of this experience may be of help to others.

Plate I shows the working drawings with dimensions for the construction of the moulds for the small cement bench shown in the illustration AI. Examination of the illustration will show that the bench was composed of five assembled parts, cast in three separate moulds. After the bench had been designed and the details all decided upon as shown by the photograph of the finished and assembled bench, the mould for the bench slab was constructed. This was made of four pieces of 1½"x2" cypress. The end pieces were recessed into the side rails about 3/16" and two long stove bolts were used to hold the parts together. This part of the construction having been completed, four pieces of moulding were mitered so as to fit snugly into this rectangular frame, and fastened in place with

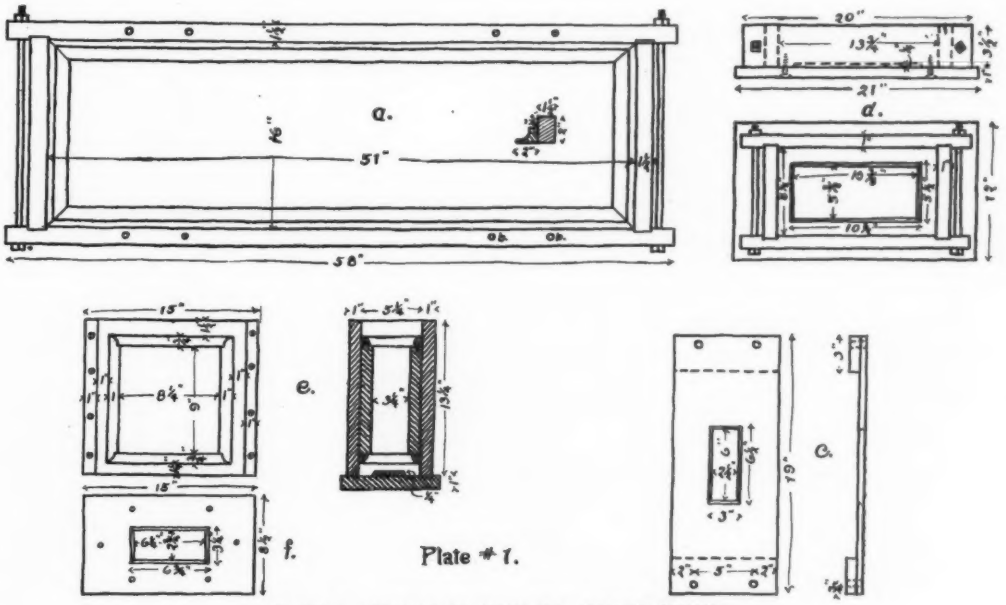


PLATE 1. DETAILS OF FORM FOR CEMENT BENCH.

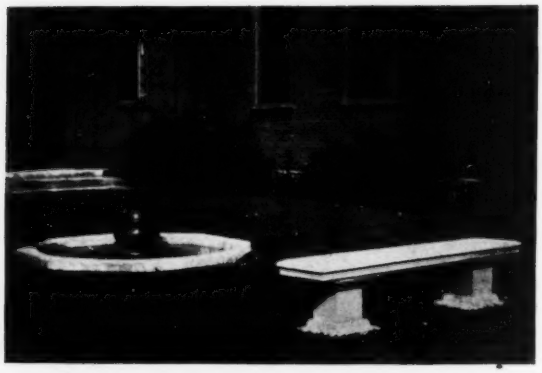


PLATE 2a. CONCRETE BENCH IN GARDEN.

screws which passed through the rails into the moulding. Next at the points marked B were drilled eight holes, ½″ in diameter and 1″ in depth; into these were driven tight fitting dowel pins which projected 1¼″ above the side rails. Upon these pins the board marked C in the drawing, was placed to mould the tenons. These moulds were placed upon the pins after the slab mould had been filled with cement, and partially set; then the tenon moulds were filled and leveled off. The slab mould in plate 2 is shown resting upon the casting table, which is just a board slightly larger than this mould, and is used for the smaller bench also. This table was made of wood and covered with one piece of 22 gauge galvanized iron which was turned down over the edges of the table and securely fastened at the edges only. Before the iron facing was fastened in place the wood was oiled to proof it against moisture. All the mould parts were given a coat of linseed oil as soon as finished to keep out the moisture.

Drawing "d" Plate No. 1 shows the construction of the mould for the cement block upon which the bench legs or pedestals rest. The bottom or table is fastened to it with four screws. The raised panel, fastened to the bottom formed the recess in the face of the block into which the pedestal fits. The mold for the pedestal (see drawing "e", Plate 1), was made of one inch cypress and three-fourths inch quarter round molding. Two pieces of cypress were cut 15″x13¼″ and upon these two pieces were fastened with screws from the back, two pieces of one inch cypress measuring 10¼″ by 9″ over all. The top and bottom edges of the attached pieces were cut square, while the two sides were mitered. After these pieces were fastened in place, four pieces of three-fourths inch quarter round molding were cut in the miter box and fastened in place at the top and bottom ends of the attached boards with finishing nails. Next, one inch out from the edges of the mitered sides of the attached boards the retaining cleats were fastened with screws to the original boards. The end pieces were similar to the side pieces in construction, except that they were of a different width and intended to fit between the overlapping side pieces of the mold. This mold also had a bottom fastened to it with six screws. In the center of this bottom board is fastened a raised bevelled edge panel which molds into the top of the pedestal the recesses, into which the tenon of the bench slab fits. Thus when the cement parts of this bench are assembled, they all interlock perfectly in the exact position called for in the design.

The description of the process of mixing the cement and the casting of the parts of this bench will be given now in detail, and will serve as instructions for the

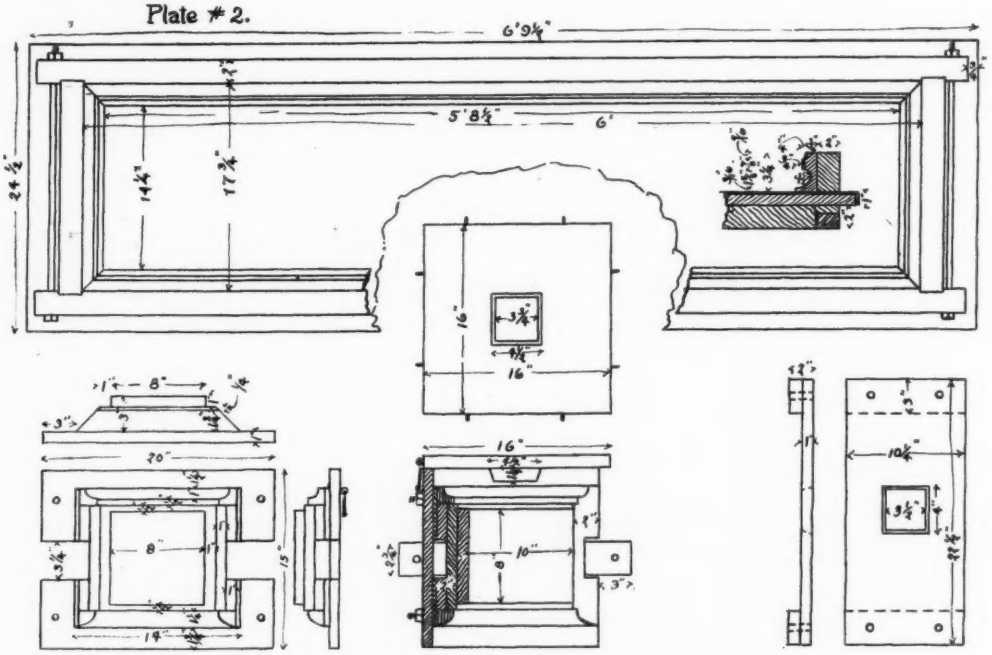


PLATE 2. DETAILS OF FORM FOR LARGE CONCRETE BENCH.

casting of all similar pieces here described and illustrated. First, estimate the quantity of mixture needed for this task. This can be done by carefully filling each mold with sand and measuring and recording the bucketfuls as placed therein. The capacity of each mold should be indelibly marked upon it. As the cement fills the voids between the particles of sand it is not taken into account in estimating the capacity of a mold, which is recorded in figures, which read so many buckets of sand. Only sharp, clean sand should be used. Of course, instead of sand one may use marble dust, or the numerous other stone aggregates, to get color and texture effects. But we shall consider that these pieces are to be cast of sharp sand and gray cement as this is the logical starting point for any experiment in cement work. The sand should be sifted through a $\frac{1}{8}$" mesh screen, and measured by the pail into the mixing trough. Now add the required amount of cement and hoe it in until both are thoroughly mixed together. A three to one mixture is strong enough; that is, three parts of sand to one of cement. The proper consistency for a mixture suitable for this type of casting is one which is almost stiff enough to stand up, but after being worked into the mold soon draws enough water to the top to aid troweling and help the mixture to settle into the mold when vibrated.

PLATE 3a. CONCRETE PEDESTAL USED AS SUN DIAL.

The assembled molds are calked at all joints with potter's clay and then oiled. The slab mold is placed upon the casting table and held in place with hand screws or iron clamps. It is then calked with clay and oiled. The reinforcing bars are set in place resting upon the points of the little supporters through which the rods are passed. These supporters are just pieces of No. 22 gauge galvanized iron which are slipped upon the reinforcing rods, supporting them upon their sharp points. The points of these supporters never show in the face of the slab. Now with the cement scoops fill in some cement mixture and work it in well around the

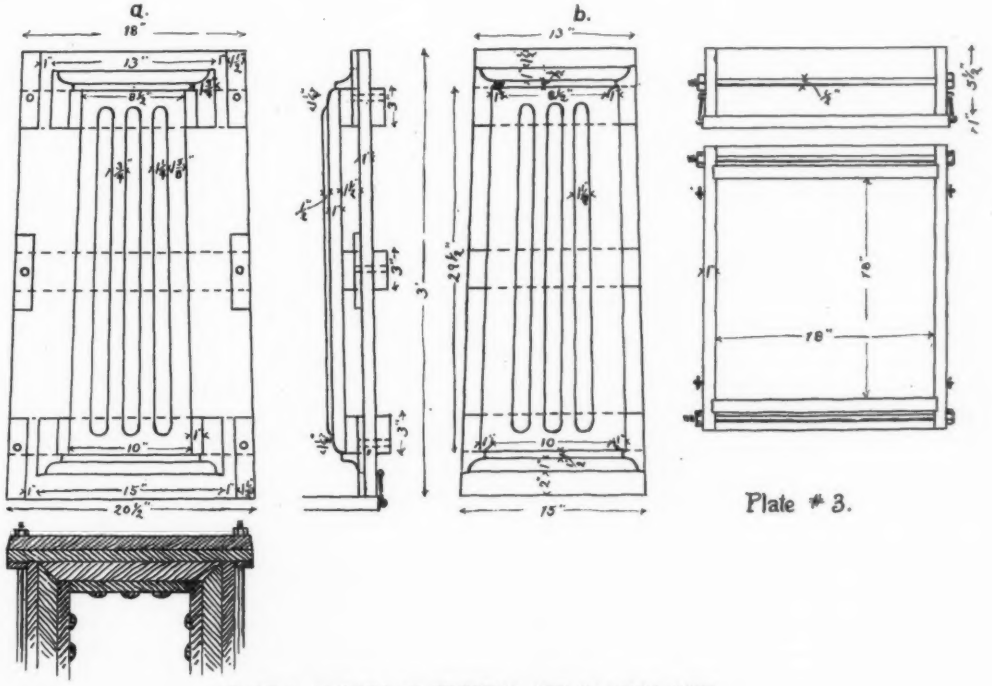


PLATE 3. DETAILS OF PEDESTAL AND OF WOOD FORM.

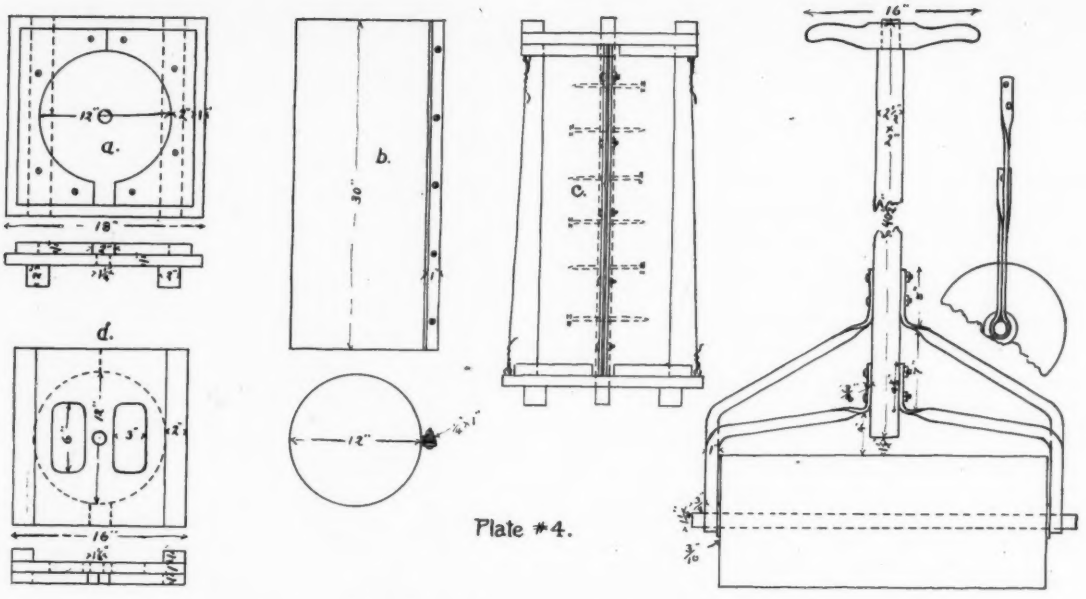


PLATE 4. DETAILS OF GARDEN ROLLER AND OF FORM FOR CASTING ROLLER.

molding before adding more. When convinced that this has been well tamped into the cuttings of the mold, fill in more mixture until the mold is filled level, then it may be troweled to complete the surface. While troweling the surface, vibrate the mold to facilitate the settling of the mixture into the lines and cutting of the mold. This is done by striking sharp blows all about the upper face of the mold. When finally it is perfectly level, place the tenon moulds upon the pins and secure with clamps or extra hand screws. Fill these tenon molds with cement, troweling off level, and the slab is complete. The other parts of the bench are cast in similar manner, only in these no reinforcing bars are needed. Care should be taken to have the molds set up perfectly level, before filling with cement. In casting the pedestals, great care should be taken in calking all joints, and especial care should be given from the start to tamp the cement into the moldings about the bottom part of the mold. No effort should be made to remove the mold until the cement has had 48 hours set.

If any pointing out is needed it should be done as soon as the mold is removed. To point out, proceed thus: Mix a small quantity of exactly the same proportion of sand and cement as used in making the cast, moistened to about the same consistency, dampen the part of the cast to be pointed, and work mixture into place with small trowel. When the pointing out has slightly set, it should be rubbed with the fingers to simulate as near as possible the surface of the cast. Should no pointing be needed, the piece should be sprayed and allowed to cure.

The bench, the working drawings for whose mold are shown in Plate 2, was a larger and heavier type of bench than the first, and composed of but three members. The parts for this bench required only two molds for the casting. While the design is more elaborate, making the construction a little more complicated, yet the molds are enough similar that a study of the first one, and a comparison of the two drawings, will explain all that the worker will need to know.

Plate 3 shows a working drawing of the molds, for a square column, and the plinth upon which it rests. This column was used for supporting bird baths, sundials, and flower-pots, and was very satisfactory. The mold for the plinth needs no explanation. The mold for the pillar or column, consists of four sides and a base which is attached to the sides with hooks and screw-eyes. The sides of the mold were constructed in pairs, so that they partially miter and partially butt together. Two of the sides overlapped the other two and are held together with 6 bolts. This explains the difference in construction noted in the drawing "a" and "b", Plate No. 3. In casting this piece, much care was taken to calk the joints securely with clay to avoid leaks. Due to the depth of the mold great pressure is exerted upon the bottom, and the slightest leak would allow large quantities of cement to escape, at a place where it could not be discovered and prevented, once the mold was filled.

Plate 4 shows the drawing for the parts of the mold for casting the cement roller shown in the assembly drawing. This roller weighed about 250 lbs. and was very satisfactory for rolling lawns or tennis courts. A mold platform was made of 1" cypress as shown in drawing "a", Plate 4. Within the retaining wall of this platform the barrel retaining wall of galvanized iron (see drawing "b" and "c") fits snugly. The upper part of this barrel like retaining wall is held securely in circular shape by a top frame and retaining members (see drawing "d"). Besides the 1¼" hole to

receive the axle of the roller, this hole being also drilled in the mold platform, the top frame also has two port holes, 6″x3″, through which the mold was filled. The barrel retaining wall was made of No. 22 gauge galvanized iron, 30″ wide and cut long enough so that when rolled up into a cylinder 12″ in diameter, there still remained one inch at each end which was bent out at right angles to make the flange. Five holes were drilled through each of these flanges, corresponding holes being drilled through two pieces of 1″x¼″ iron and short bolts were passed through the pieces of iron and the flanges which were placed between, locking the joint of the barrel retaining wall securely. A piece of one inch pipe, 35″ long was used as an axle. This was drilled at different points along its length and radiating nails inserted through these holes to act as a kind of reinforcing for the roller. When the mold was assembled, the axle and its reinforcing in place, the top frame is tied to the mold platform with guy wires which pass through screw eyes conveniently placed for this purpose (see drawing "c"). The mold having been oiled, the cement can be poured in. When settling is complete, the mold should be filled only to the lower edge of the port holes. The roller was completed by having a handle made of hard wood which was connected with the roller by two axle bearing braces made of 1″x⅜″ iron bolted in place.

(To be continued)

Industrial and Vocational Teacher Training

Homer J. Smith, The University of Minnesota

Article II

A QUESTIONNAIRE STUDY ON TEACHING FITNESS FOR FOUR TYPE POSITIONS.

AN earlier writing has reviewed the preparation of a questionnaire blank, embodying ten selected requisites of teaching success and four teacher types. Statement was there made of the classes of educators who cooperated in the work and of the nature of the judgments requested. The present article exposes the method of tabulation and gives the results of combining some three hundred opinions.

Method of Handling Data.

The rank order of importance of the ten characteristics for each of four types of teachers was desired. Individual rankings were charted in the manner next following. Each lateral column represents the place (one to ten) assigned, by an individual, to each of the ten characteristics. Four such charts were prepared, one for each teacher type. A few entries from one chart (manual arts teacher) will suffice to give clearness to the steps that follow.

INDIVIDUAL PLACEMENT, AS CHARTED FROM BLANKS RETURNED.

(Numbers at top of columns show order of the characteristics as they appeared on the blank. These numbers are used for reference purposes.)

1	2	3	4	5	6	7	8	9	10
Adaptability and Tact	Executive Ability and Class Management	General Scholarship	Knowledge of the Subject to be Taught	Good Character	Personality	Health and Appearance	Industrial Experience or Contact	Methods	Professionalism

(These numbers show rank assigned, one meaning greatest importance.)

6	4	1	1	3	5	2	9	8	10
2	1	7	3	4	5	6	8	9	10
3	4	9	1	10	2	7	5	6	8
6	3	7	4	1	2	9	10	5	8
5	4	6	1	7	10	8	2	3	9
2	3	8	4	7	1	5	9	8	10
9	2	6	1	5	3	7	8	4	10

(And so on, for 275 usable replies, in this case.)

The individual rankings having been thus charted, the vertical columns were compared, two and two, to find the one column in each pair that showed the preponderance of larger numbers and consequent lower importances. For example, following down vertical columns one and two, at the left above (extended) and comparing each pair of numbers set opposite, we find that column one has the larger number in 168 of the 275 pairs. *Each vertical column was similarly checked against each of those succeeding it from left to right.*—1 with 2, 3, 4, etc.; 2 with 3, 4, etc., across the chart. The measures of predominance, recorded as fractions, make the following table.

TABLE I.

Rankings Compared—Resultant Fractions.

	1	2	3	4	5	6	7	8	9	10
1		168		201						
		275		275						
2				192						
				275						
	199	213		240	169	159			145	
3										
	275	275		275	275	275			275	
4										
	153	258		175						
5										
	275	275		275						
	162	167		198	166					
6										
	275	275		275	275					
	221	223	180	237	234	223		139	182	
7										
	275	275	275	275	275	275		275	275	
	209	228	170	259	189	183			172	
8										
	275	275	275	275	275	275			275	
	189	210		249	140	158				
9										
	275	275		275	275	275				
	248	253	232	262	222	218	190	200	242	
10										
	275	275	275	275	275	275	275	275	275	

The table should be read as follows. Column 1 is greater than Column 4 in 201/275 of the cases; 79 in 182 of the 275 cases, etc. (The larger number occurred more often in Column 9 than in Column 6, etc.)

The fractional comparisons (Table I) were next changed to per cents and the per cents were placed in positions corresponding to their common fractional equivalents. Table II is thus a translation of Table I.

TABLE II.

Fractional Comparisons (Table I) Changed to Per Cents.

	1	2	3	4	5	6	7	8	9	10
1	——	61	——	73	——	——	——	——	——	——
2	——	——	——	69	——	——	——	——	——	——
3	72	77	——	87	61	58	——	——	53	——
4	——	——	——	——	——	——	——	——	——	——
5	55	93	——	63	——	——	——	——	——	——
6	59	61	——	72	60	——	——	——	——	——
7	80	81	61	83	80	81	——	51	67	——
8	71	83	61	94	69	66	——	——	63	——
9	68	76	——	95	54	57	——	——	——	——
10	90	92	89	96	80	79	69	73	87	——

The table should be read as follows: Column 67 in 61 per cent of the cases, etc.

The percents were next changed to P. E. (Probable Error) values, by reference to the table of *P. E. Values Corresponding to Given Percents of the Normal Surface of Frequency.* See Van Wagenen.[1]—Table 28, page 32.

TABLE III.

Per Cents (Table II) Changed to P. E. Values or Distances.

The table should be read as follows. The P. E. distance from Column 8 down to column 3 is .41: from 3 down to 9 is .11, etc.

	1	2	3	4	5	6	7	8	9	10
1	——	.41	——	.90	——	——	——	——	——	——
2	——	——	——	.73	——	——	——	——	——	——
3	.86	1.09	——	1.67	.41	.29	——	——	.11	——
4	——	——	——	——	——	——	——	——	——	——
5	.18	2.18	——	.49	——	——	——	——	——	——
6	.33	.41	——	.86	.37	——	——	——	——	——
7	1.24	1.30	.41	1.41	1.24	1.30	——	.03	.65	——
8	.82	1.41	.41	2.30	.73	.22	——	——	.49	——
9	.69	1.04	——	2.43	.14	.26	——	——	——	——
10	1.90	2.08	1.81	2.59	.77	1.19	.73	.90	1.67	——

Having obtained the P. E. distance from each characteristic to each one lower in rank, it was possible to compute their relative distances from the position of "number ten," the highest number and therefore the point lowest in the scale. This was done by finding through averaging, the true meaning or net result of the several relationships expressed by the P. E. values. The values determined are really distances from 10 and permit placement in rank order of importance.

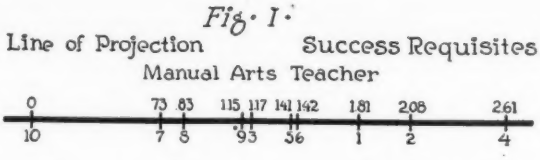
Just here it must be explained that to place the ten given characteristics in any certain rank order does not assign zero value to the first, exceedingly high value to the last, and definite and equally spaced intermediate values to the remaining eight. The characteristic given lowest rank may be said to be of any thinkable amount of desirability and all of those following it are to be thought of as more important—relatively more important as indicated by their distances from it.

The rank order of the characteristics with their respective distances from the point of least importance are here shown, for the case in review, (manual arts teacher).

Rank—Number and Name of Characteristic	Relative Location
10—10 Professionalism	At Any Position X
9— 7 Health and Appearance	.73 above X
8— 8 Industrial Experience or Contact	.83 above X
7— 9 Methods	1.15 above X
6— 3 General Scholarship	1.17 above X
5— 5 Good Character	1.41 above X
4— 6 Personality	1.42 above X
3— 1 Adaptability and Tact	1.81 above X
2— 2 Executive Ability and Class Management	2.08 above X
1— 4 Knowledge of the Subject to be Taught	2.61 above X

[1]Van Wagenen, Marvin J.—Historical Information and Judgment in Pupils of Elementary Schools, Teachers' College, Columbia University, Contributions to Education No. 101, Teachers' College, Columbia University, New York City, 1919.

Fig. I.

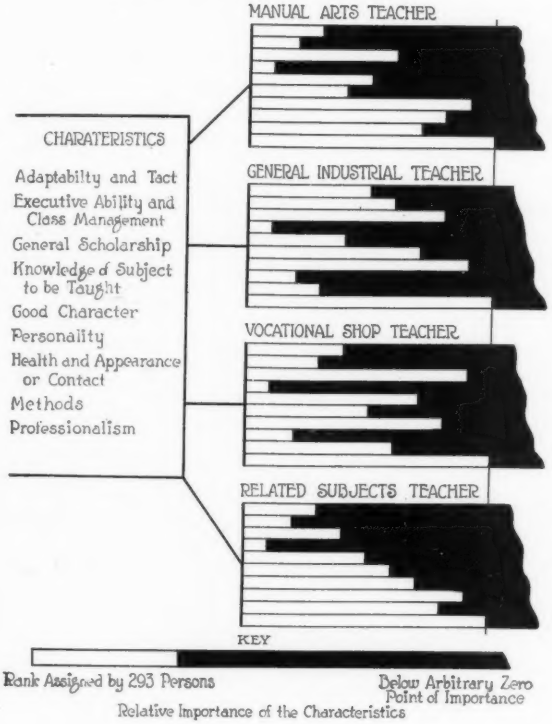


The P. E. distances respectively assigned to the characteristics, shown at the right above, were used at this point to get the projection of the qualities. For convenience a line was drawn, in this case, 4 5/64 inches long. There being 2.61 units of distance from X to the position farthest from it, the decimal points were dropped and each unit assumed to be one sixty-fourth of an inch in length. 261 (units) x 1/64"=4 5/64". This line was divided to show the characteristics in their rank order positions, unevenly distributed from an arbitrary point of low importance. This is the way some three hundred persons consider the ten qualities with reference to the typical manual arts position. The line shown has been proportionately reduced.

The Four Teacher Types Compared.

The other groups are difficult of interpretation as they come from the computation pages, so they are brought out immediately through graphs. The figures do indicate, however, at a glance, that the ten qualities of fitness were not given the same order for all four types of teachers. The numbers shown are the identification numbers given earlier in this article and again in Figure Four. For the manual arts teacher characteristic 10

Fig. II. TYPES of TEACHERS COMPARED
CHARATERISTICS ASSUMED TO BE EQUIDISTANT

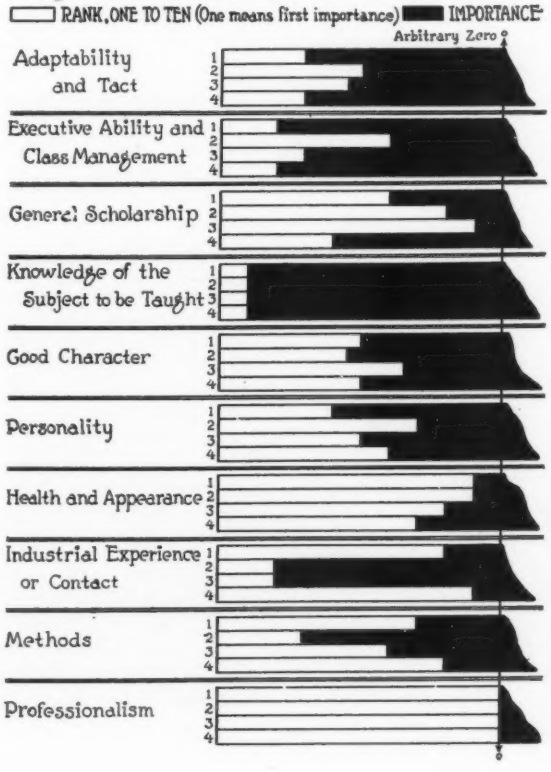


(professionalism) was ranked lowest, 7 next, and so on to 4 (Knowledge of the Subject to be Taught.)

Manual Arts Teacher.....	10	7	8	9	3	5	6	1	2	4
General Industrial Teacher..	10	7	9	6	8	5	1	2	3	4
Vocational Shop Teacher.....	10	3	7	5	9	6	1	2	8	4
Related Subjects Teacher....	10	7	9	8	6	5	3	1	2	4

Adaptability and tact are seen to be about equally necessary for all four types of teachers concerned. *Executive Ability and Class Management* seem not to be quite so essential to success for general industrial work as for the three other types. *General scholarship* is not given high rank except for the related subjects teacher. *Knowledge of the Subject to be Taught* is seen to be most important of the ten characteristics for each of the four types of classwork, and to be equally important for all. *Good character* is equally important for all, and, as brought out previously, should, perhaps, not have been included in the list of characteristics prepared, but rather assumed for all in greatest possible measure. *Personality,* and *Health and Appearance* were credited with lesser importance, judgments being modified here, also, by difficult classification. *Industrial Experience or Contact* are held as highly requisite for the general industrial and the vocational shop teacher. *Methods* is given most prominence for the general industrial teacher and is of considerable importance for all. *Professionalism* is given lowest rank for all. Here it should be again pointed out that the end position does not signify little or no importance. The scale may well begin at any chosen place, or amount of importance. As was previously mentioned two persons who returned questionnaire were confused as to the meaning of *professionalism.* It must also be borne in mind that this characteristic is comprehended to a considerable extent by several of the other attributes and attainments. Further discussion of these findings will be made.

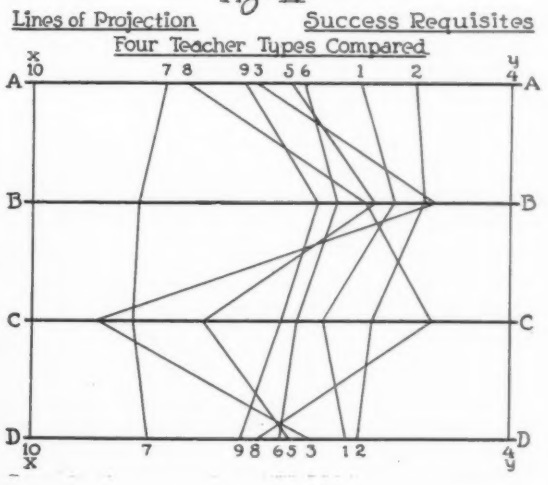
Fig. III. THE CHARACTERISTICS COMPARED



It was interesting to note as the work progressed that the four groups of people cooperating in this study (see first articles) are nearly in unison in their opinions of the requisites for success in the various kinds of class work. Scrutiny of curricula designed by training institutions should find them concerted in attitude and we conclude that curricula once scientifically built will be judged by all with similar standards. Teachers in these special fields are now probably elected and rated by standards approaching uniformity.

The statistical method employed gave definite placements as well as rank order, but the judgments reached are not modified to any great extent by these minute findings. Our feeling is strengthened however are such as may be thought of in terms of amount. The accompanying chart, Fig. IV, shows the requisites for four types of teachers projected on straight lines of equal length and virtually comprising scales, the distances between points being known. The number of opinions range from 275 to 293 in the four cases.

Fig. IV.



Characteristics 10 (Professionalism) and 4 (Knowledge of the Subject to be Taught) retain identical places throughout. Numbers 7 (Health and Appearance), 2 Executive Ability and Class Management, 6 (Personality, and 1 (Adaptability and Tact) hold positions quite uniform, while all others travel through wide ranges. The six mentioned, then, seem to be the most constant requisites for all teachers at their approximate positions.

In view of the fact that success requisites can be thought of in terms of amount and that they have, by three hundred individuals, been given definite places of importance we feel justified in using the findings as a measuring scale in connection with teacher training. It seems possible now to attempt to evaluate the typical offerings at institutions of training in terms of these combined opinions.

Teacher Training Activities.

Numerous agencies are preparing teachers for industrial schools and classes or increasing the efficiency of men in industrial and vocational class teaching. Conferences are held in various parts of the country upon call of federal supervisory agents. State boards plan programs of varying intensity and length at convenient points within states. Municipalities inaugurate short courses for evening enrollment by teachers and prospective teachers. Universities, colleges, and normal schools are assisting greatly in the work by regular and summer session offerings, by extension classes, and by correspondence courses. Besides these, there are special institutions of training conducted by private citizens and by organizations, all productive of more men more nearly prepared for these special types of service. It would be almost impossible to evaluate the services of these various agencies, either in terms of numbers of persons aided or of the lengths of terms or the breadths of offerings. One has only to conclude that every attempt in some measure succeeds, and that the total effect is an increased interest in industrial classwork and increased understanding of the problems met by those who work in this branch of the profession.

The writer has expressed elsewhere[2] his belief that "* * * * ultimate success in a profession and the time necessary to attain one's greatest usefulness in it are dependent in large measure upon his initial training for the work. * * * It is appreciated that professional men rise rapidly through ability to study cases in practice and to make new adaptations to new conditions without losing sight of fundamental truths and aims * * *." These considerations point to training by means of well-planned curricula and to the spending, by each recruit, of considerable time in an atmosphere of the methods and the problems of the schools. Conferences and courses help, but our schools need teachers of more thorough preparation than can be gained in limited time and through scattered courses. There must be breadth and fullness and unity. The curricula of our Universities, Normal Schools, and special institutions of training should have our first consideration, because they afford preparation of length and are designed for the attainment of definite ends.

Fifty Curricula Examined.

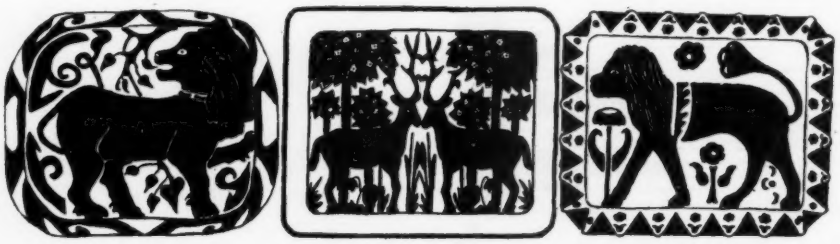
Attempt is here made to evaluate present two year and four year curricula by examination of 25 representative offerings of each length. The institutions concerned are located in 29 states of the Union. The four year curricula used are scattered in nineteen states, eleven of them being offered in colleges and universities, eight in technical institutions and agricultural colleges, and six in Normal Schools. The curricula two years in length were drawn from twenty states,—thirteen from normal schools, seven from colleges and universities, and five from technical institutes and agricultural colleges. Thus, we are assured that they are typical and represent all parts of the country.

Three-year and five-year curricula were disregarded because they are few. Offerings less than two years in length were allowed to pass as worthwhile but inappropriate as subjects in this study. They may well be included in a survey of activities presenting less uniformity. They are, in fact sets of courses or suggested groups rather than curricula.

Bulletins were requested from institutions and the courses offered were classified. Percentages seem best adapted to the purpose of this comparative work and are more easily derived than are total credits or class hours. Systems of credit vary greatly as to the lengths of terms and the corresponding values of the earnings of students toward graduation. In each instance, then, the total necessary hours or credits was found and used as a base for computation. As courses were classified, totals were found for all types of work and these totals were changed to whole per cents of the bases used. While one institution graduates with sixteen units of credit another exacts 180 by reason of different accounting, so we chose percentage classification for convenient entries.

(To be continued.)

[2]The Need of Training. Industrial Arts Magazine 10:214-226, June, 1921.



DESIGNS WORKED OUT BY STUDENTS OF ART IN THE SENIOR HIGH SCHOOLS, CLEVELAND, O.
Miss Helen Fliedner, Instructor of Art.

ASSEMBLY OF CHARACTERS IN COSTUME PAGEANT.

Costume Design Pageant[1]

C. Edward Newell, Springfield, Mass.

I. *Introduction.*

II. *Enter Egyptian girl (left).* She walks to center front and speaks: What a wonderful party it was! I saw costumes of every age—beautiful ones, odd ones, and queer ones. But no one else thought of wearing an Egyptian dress. (Takes an Egyptian pose.) I wonder if they noticed my necklace and crown. (Indicates things mentioned.) How we worked to make them just like some which were dug up among the ruins of the tomb of an Egyptian princess who lived 2000 B. C. Think of it, the jewels of a princess! I can imagine that girl of Ancient Egypt having her hair curled by her slaves and dressed just as I have mine. I wonder if they noticed my armlets and my shoes of gold. They are all copied from pictures which the Egyptians themselves painted on the walls of their tombs. How fond they were of brilliant colors—red, yellow, and blue (indicating them in her costume)—the primary colors. They used them in everything from their jewelry to their fashionably narrow skirts. And I wonder if they noticed that this blue design is the scarab, the sacred Egyptian beetle. But how tired I am! (Goes to couch and lies down.) How I should—love—to see it—all over again (speaks drowsily and with the last word falls asleep).

[1]The costume pageant illustrated and described on these pages was presented to the Springfield Art League by students of the Art and Home Economics departments of the Central High School. The costumes were designed and made and the assembly was arranged under the direction of Miss Grace L. Bell, Head of the Art Department. Miss Bell was assisted by Miss Rose L. Buckley and Miss Harriet D. Gerould, assistants in Art and Home Economics.

EGYPTIAN PRINCESS AND SPIRIT OF DREAMS.
(Nos. II and III.)

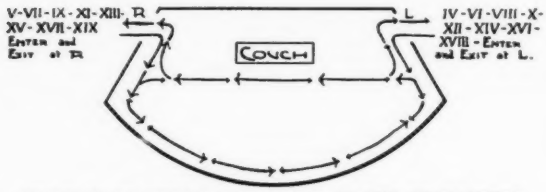
III. *Spirit of Dreams* enters R with a silent gliding motion, arms extended. Advances to back of couch. Extending her arms over sleeping Egypt she speaks in a slow resonant voice: "I am the Spirit of Dreams. This night your wish will be realized. One by one I shall summon before you (touches E. slightly to awaken her) the people whom you have seen." (She beckons left and Greek maiden enters. The Spirit is entirely in control and she beckons and dismisses each figure. Egypt describes each in turn.)

IV. *Greek maiden* enters at left; Egypt speaks: "A maid of ancient Greece so strong and free! How simple yet how beautiful is the robe she wears. See, the garment hangs loose from the shoulders, allowing perfect freedom of motion. Yet it falls gracefully into folds, presenting great opportunity for variety in arrangement. I can imagine this Greek girl playing ball with her maidens in the marble-paved court of her villa.

How fond she is of gold; see, she has used it in the lavish decorations on her skirt, her tunic, and in the fillet which binds her hair. Even her necklace is of solid gold. What a blessing it would be if the girls of this athletic age could be so simply clothed in flowing robe and sandals."

(Exit Greek Girl)

V. *Enter Roman Imperator* R; (shown in group at foot of couch). The military bearing of this "Roman as well as his attire betrays his profession. A soldier in the ranks of Rome! See how his red cloak hangs loose from his right shoulder so as not to interfere with his good sword arm. And the under tunic is short, that he may move about freely in battle. The long toga of his brother in the Forum would be his death in a skirmish. There is something unusual in the tunic; it has long sleeves. I know by this that this Roman soldier lived before Christ, during the Conquests of the Teutons, for it was among these barbarians that this custom arose, and it crept gradually into Roman attire. His red cloak tells one that he is not a mere soldier but a general—an imperator—and a successful one, too, for the red cloak was worn only when celebrating a triumph." (Exit.)



STAGE PLAN AND LINE OF MARCH OF THE CHARACTERS.

VI. *Enter Early Mediaeval Woman*—Left.

"This early mediaeval lady is the wife of Clovis, the first King of France. In the fifth century A. D., when Clovis reigned, the nobles lived in stone castles with no other method of heating than stone fireplaces. Therefore her dress is very heavy and warm, and a cloak is added to keep the Queen's back warm when sitting before the fire. She probably spent her time embroidering lovely tapestries or caring for her long hair, which was the pride of mediaeval women. The court was no more pretentious than the homes of the barons. When the people tired of one stone castle, they packed their ponderous furniture into cumbersome wagons and journeyed on to the next, leaving the first to sweeten." (Exit.)

VII. *Enter Jeanne de Bourbon*—Right.

"Jeanne de Bourbon of that famous house of France, who lived during the first terrible years of the Hundred Years' War! But despite the war she probably saw much gay life at the court where centered all the splendor of the early thirteenth century. How lavishly her gown is decorated with fur and jewels! One might almost believe that hip pockets on modern dresses were copied from this selfsame gown. But what an odd way to arrange the hair! It is like a square frame about the face." (Exit.)

THE GREEK MAIDEN.
(No. IV.)

EARLY MEDIAEVAL—FRENCH.
(No. VI.)

EARLY FIFTEENTH CENTURY.
(No. IX.)

ITALIAN LADY OF RENAISSANCE PERIOD. (No. X.)

LATE 16TH CENTURY FRENCH. (No. XII.)

EARLY 16TH CENTURY FRENCH. (No. XI.)

VIII. *Enter a Page*—Left.

"This variegated person is a fourteenth century page, and he had no easy life. Taken from his parental estate at seven years of age, he was placed in the home of a baron, to act as a messenger for the lord of the manor, and wait upon and amuse the lady. Before he could become a squire he had to spend his seven years of servitude trotting about at the will of these nobles. The bi-colored arrangement of his costume dates from the days of heraldry, when it was the fashion to wear upon one side the colors and the coat of arms of one's own house, and upon the other those of the reigning monarch. How like our present day garden smocks is his queer tunic. I can imagine him doffing that little boat-shaped cap and bowing low before his haughty fourteenth century mistress. But how do you suppose he ever kept from tripping over his own toes?" (Exit.)

IX. *Enter Early Fifteenth Century Lady*—Right.

"Gracious! but Charles the VI must have had high doorways in his palace. And to think that this hideous fashion lasted for 75 years! See, this hennin has a veil. Perhaps the fashion of wearing veils on our hats today descended from the enlarged horns on this fair court lady. But her gown is quite charming and somewhat in vogue, has a vestee and is fashionably low in back. What a lovely waist she has, printed in gold in the original fleur-de-lis of France. So looked the ladies at Rheims when Joan of Arc crowned Charles the Sixth."

X. *Enter Italian Lady of Renaissance Period*—(Exit.)

"This lovely Italian lady looks as if she had just stepped from Ghirlandajo's painting, 'The Visit of Saint Elizabeth.' Gowns of the High Renaissance Period in Italy hung straight from the shoulder with no sign of a waist line, and were made of costly brocades. It was a wonderful period in which this lady lived, one of highest art development in Italy. Many famous artists lived then, among them Botticelli, Da Vinci, Raphael, and Michael Angelo. Probably in her walks along the streets of old Florence she saw Dante's birthplace, and Giotto's tower, which Longfellow has called a lily in stone. Perhaps, too, word came to her ears of the discovery of our own country." (Exit.)

XI. *Enter Early Sixteenth Century Lady*—Right.

"This charming court lady must have danced at the court of Francis I. Here for the first time hoops appear. The little stools upon which the ladies sat were completely hidden by their bell-like skirts. It is said that when the king held public reception, he had the furniture all moved out of his palace to make room for the ladies. The love of fur and jewels is evident in this century as well as earlier. How simply her hair is arranged! What a change from the hideous hennin of the fifteenth century! Always after an extreme, fashion reverts to the distinctly opposite." (Exit.)

XII. *Enter Late Sixteenth Century Lady*—Left.

"I might almost believe that this stately dame were Queen Elizabeth if I did not know that she is Queen Marguerite, wife of Henry IV of France. The ruff which she wears about her neck was introduced into France by Catherine de Medici, the Italian wife of

JEANNE DE BOURBON (FOURTEENTH CENTURY FRENCH) AND PAGE. (Nos. VII and VIII.)

Henry the Second. Frills worn around the necks of modern dresses are really modified ruffs. The farthingale, or pleating about the waist, also has been modified for use in modern garments. Her gown is very dignified and handsome, and the ruff makes a becoming frame for the face." (Exit.)

XIII. *Enter Puritan Girl*—Right. (No photograph.)

"I see no longer the gay life of the courts but young America and the somber gray of the Puritan. Perhaps this demure maid came down the old Bay Path in 1636 and helped to found our city of homes. These settlers were sturdy folk, and the frivolities of the court were sinful and wicked in their eyes. Believing in self-denial and privation they adopted this simple style; serviceable material, plainly made, with no ornamentation." (Exit.)

XIV. *Enter Late Seventeenth Lady*—Left. (No photograph.)

"Back again in France in the gay whirl of Louis XIV's spectacular court. Gowns were more frivolous than ever, bedecked with ribbons and laces. It is said that Mlle. de Fontanges, a favorite of the King, while on a hunting party, lost her bonnet, and used her beribboned garter to fasten her hair. The garter was adorned with a rosette which proved so becoming to Mlle. de Fontanges that the king expressed approval, and immediately coiffure à la Fontanges became the style all over France. Everyone from princess to peasant wore this towering edifice of lace and ribbon. This lady is *en negligée*. Her blue dressing gown might well be the parent of our present-day lounging robe. And her cap might be the mother of a boudoir cap, a nurse's bonnet, a maid's frill, or all three." (Exit.)

XV. *Enter Girl of the Period of Louis XV.*—Right.

"This gay dancing lady in tight bodice and beflowered skirt might well be the daughter of Louis XV. At any rate she probably saw much of the brilliance of his court. No doubt she heard Mozart play when he was but an infant prodigy. Life was very care-free at the court in the reign of this Louis. Hoop skirts, which in the previous century had taken a decided slump, now billowed out again. The nobles amused themselves with plays, picnics, fetes, hunting parties and games." (Exit.)

XVI. *Enter American Girl—Time of George Washington*—Left.

"Back again in America, this colonial girl in powder and patches might well have graced a Mt. Vernon banquet. Her gown has the fashionable draped hip line and loose hanging back. Perhaps this girl knew General Washington. Maybe she danced with Lafayette. Without doubt she could tell us many a thrilling tale of the war, and no doubt she rolled many bandages and knit many socks. Perhaps, too, she heard rumors from over the sea of the French Revolution." (Exit.)

XVII. *Enter Early Nineteenth Century Girl*—Right.

SECOND EMPIRE. AMERICAN. (No. XVIII.)

"This lovely empire gown was introduced into France by Josephine, the beautiful wife of Napoleon Bonaparte, and it soon became popular in America. Those dainty, little, short sleeves are just what we are wearing today. And what a fashionable hat she wears, turned back boldly from the face. This dress is cut somewhat along the lines of the Greek costume, following the shape of the figure. No attempt is made to distort or change the curves and graceful lines. Her tasseled scarf with its printed border was copied from the Greek." (Exit.)

XVIII. *Enter American Mother and Daughter, a Second Empire Lady with Little Girl*—Left.

"In the Second Empire period, during the reign of Napoleon III, hoops were once again in vogue. Such a lovely brown silk as this our grandmothers might have worn. I have heard my grandmother tell that there were 25 yards of Skinner's silk in her Sunday dress. Hoops for little ladies, too, were necessary and pantalettes often elaborately embroidered finished the costume." (Exit.)

XIX. *Enter Young Woman of Late Nineteenth Century*—Right.

"In the late nineteenth century the hoop lost its favor and was replaced by a melon-shaped bustle. The designers once more forgot the beautiful lines of the human form and did their best to make it hideous. What puzzles me particularly is, how this lady could sit." (Exit.)

XX. *Tableau.* Action: Characters enter, eight from each side, to soft music and march in a circle around the couch of the princess guarded by the Spirit of Dreams. When the music ceases they group themselves in an attractive tableau.

18TH CENTURY COSTUME OF THE LOUIS XV PERIOD. (No. XV.)

A Radio for the Haversack

Allen D. Backus, Newark, N. J.

A HAVERSACK Set! The very name appeals to boys. To those who are members of a scout troup immediately comes the vision of the hike; this time with a haversack crowded with a wireless, phones and a coil of wire. There is an appeal to all in the idea of a set which can be carried, but which will not become a burden and which will do just as good work as the set in the den at home.

The Haversack Set herein described was designed

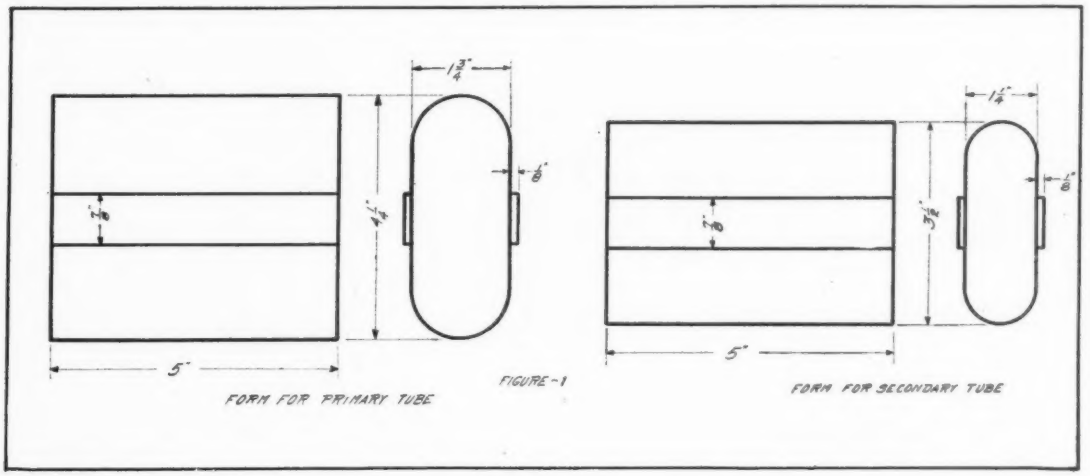


FIG. 1.

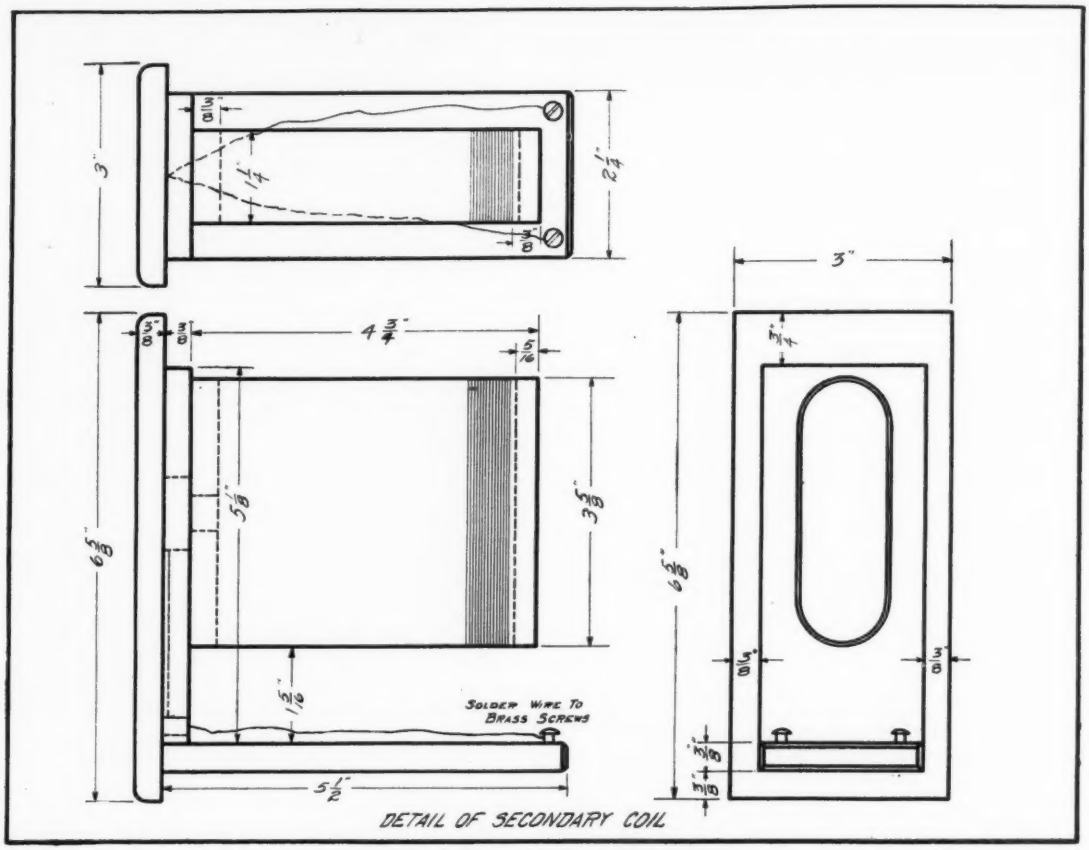


FIG. 2. DETAILS OF SECONDARY COIL.

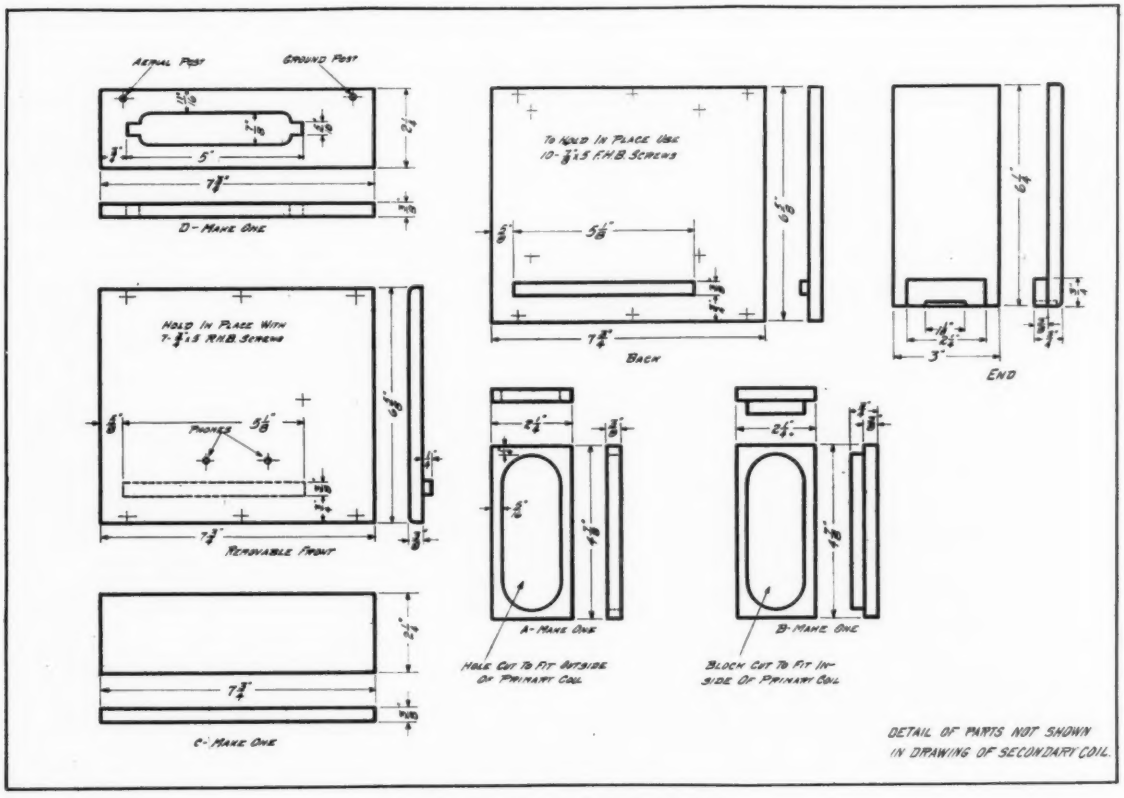


FIG. 2a. DETAILS OF SECONDARY COIL.

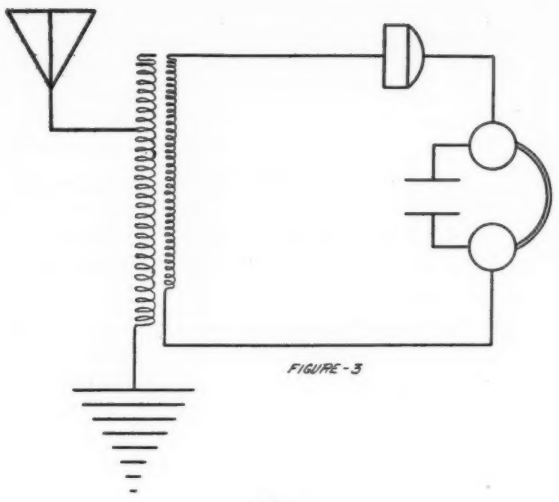


FIG. 3.

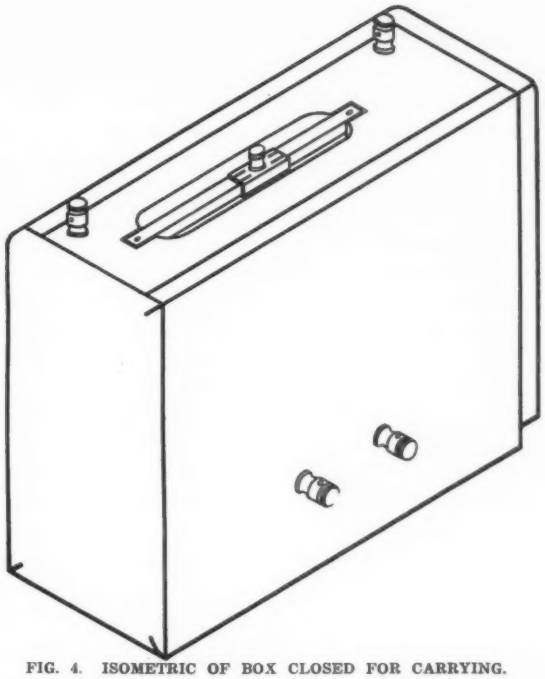


FIG. 4. ISOMETRIC OF BOX CLOSED FOR CARRYING.

by George F. Bowne of the Layfayette School, Newark, New Jersey. Mr. Bowne has used radio telegraphy and telephony in his shopwork for years; he knew its value as a manual training subject long before the manufacturers realized its commercial possibilities and established numerous broad-casting stations.

George Bowne is not only an interesting person to know but also a splendid teacher. I think this is largely due to the fact that he has a vocation, and avocation and also a hobby; his vocation, of course, is teaching; his avocation, boy scout work; while his hobby is boys. From this combination there results a succession of ideas which would make a boy heaven of any

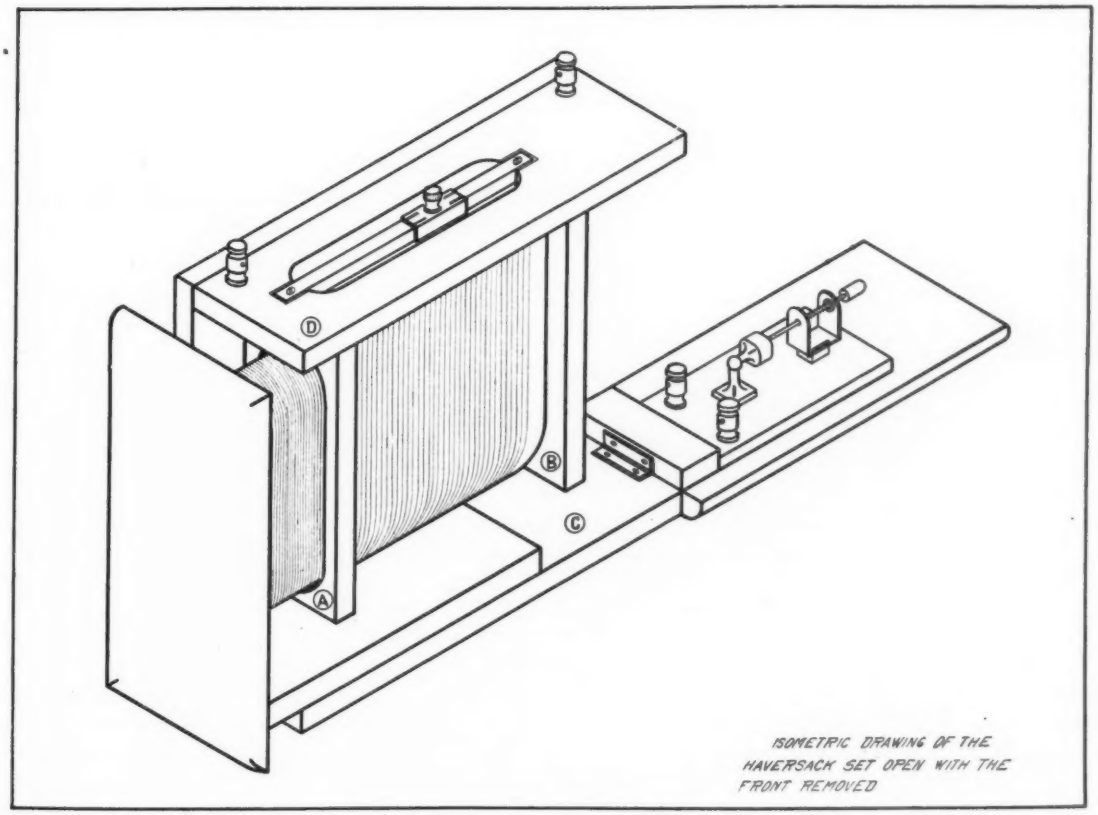


FIG. 5. THE SET OPEN FOR USE.

manual training shop. The Haversack Set is one of these ideas.

We have all seen the small sets built into match boxes, walnut shells and the like and some of us have listened in on such sets and know that while one can hear the result is very disappointing. This is not so with the Haversack Set. Not only is there no resultant disappointment but rather a big surprise. As compared with other loose coupler sets having crystal detectors the signals come in remarkably loud and clear.

The oval shape of the coils is distinctly unusual and may or may not be the cause of the excellence of this instrument. Mr. Bowne has one or two rather plausible theories to prove that better inductance is obtained with this type of coil than with circular ones.

The drawing will, I believe, enable one to make a set which will prove the equal of any crystal detector set on the market, not only for clearness and intensity but for distance as well.

The following suggestions may help in making this set:

The Case. All the stock used is 3/8" in thickness and may be any kind of wood desired. All parts should be carefully laid out, cut to size and completed before assembling. All parts are fastened together with screws. The front piece is removable and allows for easy adjustments of its hookup, etc. It is unnecessary to say that a good finish will add much to the final appearance of the set.

The Coils. The coils, both primary and secondary are wound about oval tubes which will have to be made in the shop. For these tubes forms were made in the shop as shown in Fig. 1. Heavy drawing paper was cut into strips whose width was the length of the coil. This paper was then wound around the coil in layers, glue or paste being placed between each thickness of the paper as it was wound. When one strip of paper has been wound and another is started be careful to have the ends meet but not overlap. This is continued until the tube being prepared has a thickness of about one eighth of an inch. It is then left for a few hours after which the tube is removed from the form and put on the radiator or in some warm place to dry. It must be completely dry as all shrinking should take place before the coil is wound.

When the tubes are finally prepared and ready for the winding a very thin coat of shellac should be given them. The winding itself should be done very carefully and by hand. The primary coil should have 110 coils of No. 24 cotton covered copper wire while the secondary soil should have 160 turns of No. 28.

Slider and *Contact.* For tuning on the primary coil a regular slider is used which can be purchased or made if desired. This slides on a quarter inch square brass rod five inches in length.

Condenser. There is plenty of room for a small fixed condenser on the partition supporting primary coil toward the detector end of the case.

Tapping of *Secondary Coil.* The secondary coil could be tapped and contact points and switch put on the end of the box which slides out. My experience has been that nothing whatever is gained by this in a crystal set if the right amount of wire is used in the coils.

Hookup. Various hookups may be used and the best determined by experiment. I found the one shown in Fig. 3 very successful with the set.

Some Uses of Intelligence Tests in Continuation School

E. Joseph Goulart, Cambridge, Mass.

I HAVE been asked to explain the use of Intelligence Tests as a basis for assigning pupils to classes and also as a basis for vocational guidance.

The prevailing method of assigning to classes is based on the last grade attended or completed, the theory being that they have attained an equality of mentality by reason of their progress through the grades. If you have taught an average eighth grade you know that there is a very wide range in the mental capacity of its members. The same may be said of any grade. It is, therefore, readily seen that such a grouping is not a standardized measure for an organization whereby the maximum of group instruction may be utilized successfully. This type of instruction is essential if we are to devote the major portion of teaching hours to individual work, the theory upon which Continuation School is founded.

Moreover, in an organization of this kind we do not allow for short term and long term pupils, (the short term pupils are those who are almost 16 and are going to remain with us for only a few months; the long term pupils, those who are going to be with us for a period of almost two years) and as a result, because of the constant turnover in class enrollment, the teacher cannot plan advanced work for any group although it is possible to do so for individuals. There is no bright spot in the week's program to hold the teachers in Continuation School work and the inevitable result must follow; teachers will soon tire of this daily grind and move on to more attractive fields. We must so organize our school as to give every teacher a long term group of high intelligence quotient which will enable the teacher to do advanced work and break the routine in the week's program.

Such an organization can be developed only by the use of intelligence tests. The score obtained by the pupil determines his mental age, in accordance with a standardized scale. This has been obtained by testing thousands of pupils and is not a matter of guess work.

His intelligence quotient is then obtained by a comparison of the mental age to the chronological age. The intelligence quotient now becomes the standard unit for grouping and assigning pupils to classes as the intelligence quotient may be assumed to be a constant factor.

Intelligence Quotient Values.
Reproduced from table by Professor A. Inglis, Harvard College.
Extract from 14 year old scale.

113.5	115	116	Standard Scores
14-0	14-1	14-2	Mental Ages
101	102	102	13-10
101	101	102	13-11
100	101	101	14-0 Chronological Ages
99	100	101	14-1
99	99	100	14-2

The intelligence quotient will be found in the spaces above.

A normal 14-year-old boy must get a score of 113.5 to get a mental age of 14-0 and an intelligent quotient of 100.

A supernormal 14-year-old boy must get a score of more than 113.5 to be above mental age of 14 and get an intelligence quotient above 100.

A subnormal 14-year-old boy must get a score of less than 113.5 to be below mental age of 14 and get an intelligence quotient below 100.

Take all the boys with a high intelligence quotient who are going to stay with us for a long period and assign them to the Wednesday group; the average intelligence quotient long period to the Thursday group; the low intelligence quotient long period to the Tuesday group; the high intelligence quotient short term to the Friday group and the average and low intelligence quotient short term to the Monday group.*

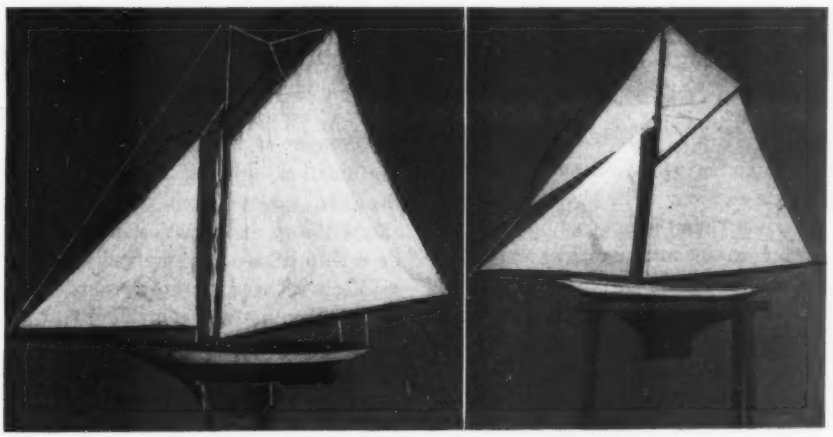
We now have a standard organization and can plan our work according to the mental capacity of each group. We will be able to do more for the boy, who is after all the end of our educational effort, and all else may be regarded as simply the means of accomplishment. This method requires more work on the part of the teachers and organizer but I feel that the good of the boy justifies the labor.

When the boy has selected his vocation we can direct his attention to branches in which his mentality would ensure success by using his intelligence quotient and the "intelligence standards for occupations of 36,-500 soldiers" as a basis for our suggestions. We can suggest to him that in a certain branch he can apparently be successful if he applies himself faithfully and that by study he may in time be qualified to enter other branches requiring more than mere manipulative ability and skill but that at present he is not fitted to enter said field. If he should enter such a branch the best he could hope for without much study would be to become a poor workman. I do not believe in saying that certain doors are closed to any boy because courage, determination and future study, factors which at present cannot be measured, may in time unlock any or all doors. (I do not mean to apply the foregoing to boys of low mentality).

If the continuation schools are to meet the end for which they were established its teachers must be humane and in sympathy with the types of boys who come to us. They must be willing to take these youngsters who do not understand the changing process that is going on within them and "gently" guide them through the dark ages to a safe and sane manhood. Let us, who have passed through the same period of misgivings and allusions, look back into ourselves during those dreary years and then understanding their temptations give them our help.

I have endeavored briefly to outline the means of establishing a new process in continuation school organization, also the type of teachers who can successfully meet and solve its problems. I am convinced that the continuation schools are evolving new methods of dealing with boys of the age under discussion, and will come nearer in helping the boys solve their problems than any other type of school.

*We can rearrange these groupings to suit ourselves. They are suggestive but may not suit your school.



MODEL BOATS DESIGNED AND MADE BY MR. EDWIN R. KING, INSTRUCTOR IN WOODWORK, NEW BEDFORD, MASS.

INDUSTRIAL-ARTS MAGAZINE

E. J. LAKE S. J. VAUGHN
Editors

EDITORIAL

PERSONALITY.

In the list of qualities for which the prospective teacher is recommended, the one of "personality" is rarely omitted. What kind of "personality" does the candidate possess? Probably no two persons could agree on the personality of a third person. Personality is most nearly analogous with individuality, and yet it does not come to the mind as a quality which is different from others, but as one which reacts upon others. A person who creates no definite or marked impression on short acquaintance is considered to lack personality.

Of the many teachers recalled of a long experience, those of most marked personality have been least successful. The best have been those persons of normal, inconspicuous ability, who have rendered faithful and persistent service.

Many fine personalities are undiscovered by those with whom they associate. They are taken for granted as part of the social order, and their service is not recognized until it is missed. Then, too late for appreciation, it is recalled that a steady, beneficial influence has gone out.

Personality is a doubtful quality when it is conspicuous, for it represents a difference from normal which is distinctive on short acquaintance. There is a premium on distinction which is dangerous to society. Advertising has become a mania with our people. Observe the poor, superficial attempts to get into print. Even our school children are afflicted with the vain desire to have their pictures appear in the morning press as distinctive in any way whatsoever. Competition is sadly overdone in the schoolroom. Cooperation should be fostered. The "personal liberty" idea should be replaced by the idea of individual responsibility. This can only be done by the teacher who values persistent, thorough effort for service, and is a living, active example of it.

GOOD, BAD, OR ARTISTIC.

One reason for high costs is our demand for something new in style or fashion. The shopper demands the latest in style, rather than the most appropriate and useful. At least four seasons and as many special occasions each year demand new things to wear. Spring, Summer, Autumn, and Winter; weddings, funerals, and social occasions of various sorts make a constant change of style necessary, if we are to be in style.

Some of us rebel against the dictates of style and take great credit upon ourselves for going about looking a little careless of appearance, but, as we think, good enough for all practical purposes. Some of us do not follow the styles closely because we cannot afford to. A few of us do not like the particular style in vogue, and refuse to follow the suggestion of the fad designer.

If we are *artistically inclined,* we are very, very particular what we wear, and disagree with the dictates of style in so far as our artistic temperament and our desire to appear individual prompts us.

It is significant that the most common advertisement of goods is the announcement that they are the last word in design. It is also significant that salesmanship operates upon the idea that the purchaser is a discriminating individual of pronounced individuality.

The matter of selling is based upon the vain glorious desire of humanity to lead the human procession, rather than to keep up with credit. We hear occasional statements from promoters of art instruction, that art training is the safeguard against extravagent and extreme style.

If this is so, then our conception of art must be that which is appropriate rather than unique. In our judgment, Industrial Art is, above all, reasonable, sensible, and appropriate, rather than that which pronounces the unique in design.

SEPARATE DEVELOPMENT.

Vocational education played a small part in the annual convention of the National Education Association at Boston. In fact the casual visitor who may have attended the general sessions quite faithfully would hardly be able to learn from the papers and discussions or from the committee appointments and resolution that there is any activity in this direction in the United States. The Department of Vocational Education and Practical Arts held a single session, but the attendance of men and women was insignificant and altogether out of keeping with the importance of the subject and the variety and magnitude of the problems involved in the organization and conduct of trade and continuation schools, prevocational schools, manual training and household arts departments, etc.

The coming combined convention of the National Society for Vocational Education of the Vocational Education Association of the Middle West of the National Home Economics Association and of the Vocational Guidance Association, to be held in Detroit during the first week of December is a logical answer to the indifference of the N. E. A. Just as vocational and continuation schools in Wisconsin have developed through separate organization so the body of professional theory and practice in vocational education will grow through separate professional associations and conventions. There is every reason to believe that the Detroit convention will contribute very much to the solidity of thought on vocational education.

CHANGING CONDITIONS AND NEW PROBLEMS.

It is not so long ago that the teacher shortage was noted in every part of the United States. Now, the shortage is relieved. The quotas are filled. The crisis

is allayed. Even the manual training departments and the vocational schools are finding an adequate supply of men.

But, there is a new phase of the situation which is manifesting itself in various sections. The teachers' colleges and normal schools are crowded to the doors with students who will be ready in a year or two to enter the profession of teaching. Will there be enough places to go around? What is to be done with the surplus?

The editor of the Bridgeport, Conn., Times, viewing this situation from a purely local angle says: "The board of education already sorely beset by irritated public opinion caused by the many changes necessitated by years of school neglect has another problem which will not be solved without vexation and heart burnings. During the war teachers' pay increased. Prices dropped, giving this pay a higher value. The result, throughout the country has been an increase of attendance at schools which instruct for the teaching profession."

The editor says that something must be done to provide positions in Connecticut for those that have been educated by the state. "What must de done," he says, "is the question to be decided."

The answer must be that the adjustment will be found when the time arrives. Experience has taught that when any city produces more teachers than it can absorb, they must make their start elsewhere. There is no danger that any state will produce more good teachers than it can absorb.

The school authorities will be enabled through the process of elimination to raise the standards of teaching. Should there be a surplus of teachers the rule of the survival of the fittest will come into play to the advantage of the schools.

In the field of vocational education there is no such pressure for teaching positions as in the general elementary school field. But the men who are coming in are better prepared than those who entered ten or five years ago, or even so late as two years ago. The number of present day applicants is relatively larger.

The crowding of teachers' colleges is merely the prelude to an era of efficiency. Now, that the compensation of teachers has been brought somewhere near what it ought to be, let the era of high standards have its sway.

THE GENERAL SHOP.

As building operations are being resumed, increased interest is manifested in the type of shop known as the "general shop." In such a shop, of course, a varied equipment is provided so that a number of different kinds of shop activities may be carried on at the same time, in the same room, and, in some cases, under one and the same teacher.

In the first place, as a general proposition, this type of shop is not to be considered in connection with strictly vocational work. It finds its place in the elementary school, in the high school, and in the part-time school with those classes whose work is designed for "general culture," "general improvement," or "general continuation" purposes. In all of these there would be found those "finding" and "prevocational" values looked for in the non-vocational type of shop work.

In the elementary school, where the work is largely for experience and general informational purposes, the general shop is an admirable thing, *provided* any principles of relationship, similarity of purpose or identity of equipment and operations is observed. Here is where the danger arises. It is not difficult to find shops where almost every conceivable activity is carried on. There are general shops where woodwork, forging, printing, mechanical drawing, sheet metal, etc., are all in progress at the same time under one instructor. In a very small class where only a few students are involved, we are disposed to grant that some satisfactory results can be produced. We are furthermore willing to say that an occasional teacher may be found who can handle all of these different lines with some degree of success. But in the main, such a situation is far from satisfactory. If it is a question of room space, then all these occupations cannot be satisfactorily represented anyhow. If it is not a matter of space there might better be some separation made between those lines that are essentially different.

It is easy to understand why a simple automobile repair equipment might be housed in the same shop with the work in machine shop practice, forging, and electrical work. Likewise, printing, bookbinding, and mechanical drawing may very properly and profitably be handled together.

A woodworking equipment might be installed in connection with simple equipments for forging, sheet metal, and such other work as is frequently involved even in simple problems of woodworking. By force of necessity, many a woodworking teacher has his mechanical drawing done in his woodworking shop, but an attempt to have the two lines of work in progress at the same time usually leads to confusion and poor results. Likewise, it is difficult to see any advantage in trying to combine the two wholly unrelated lines of printing and woodworking, or sheet metal work. To be sure they are sometimes found in the same shop, but usually on account of lack of space and not on account of any relationship or a desire to simplify the handling of the two different kinds of work.

When it is a question of doing one's best with limited equipment and small space, any kind of a combination might be defensible if the teacher can really handle the combination. We have had in mind in this discussion, however, the deliberate building or providing of new quarters for a variety of work to be done with the greatest advantage, with the greatest ease, and with the fewest teachers.

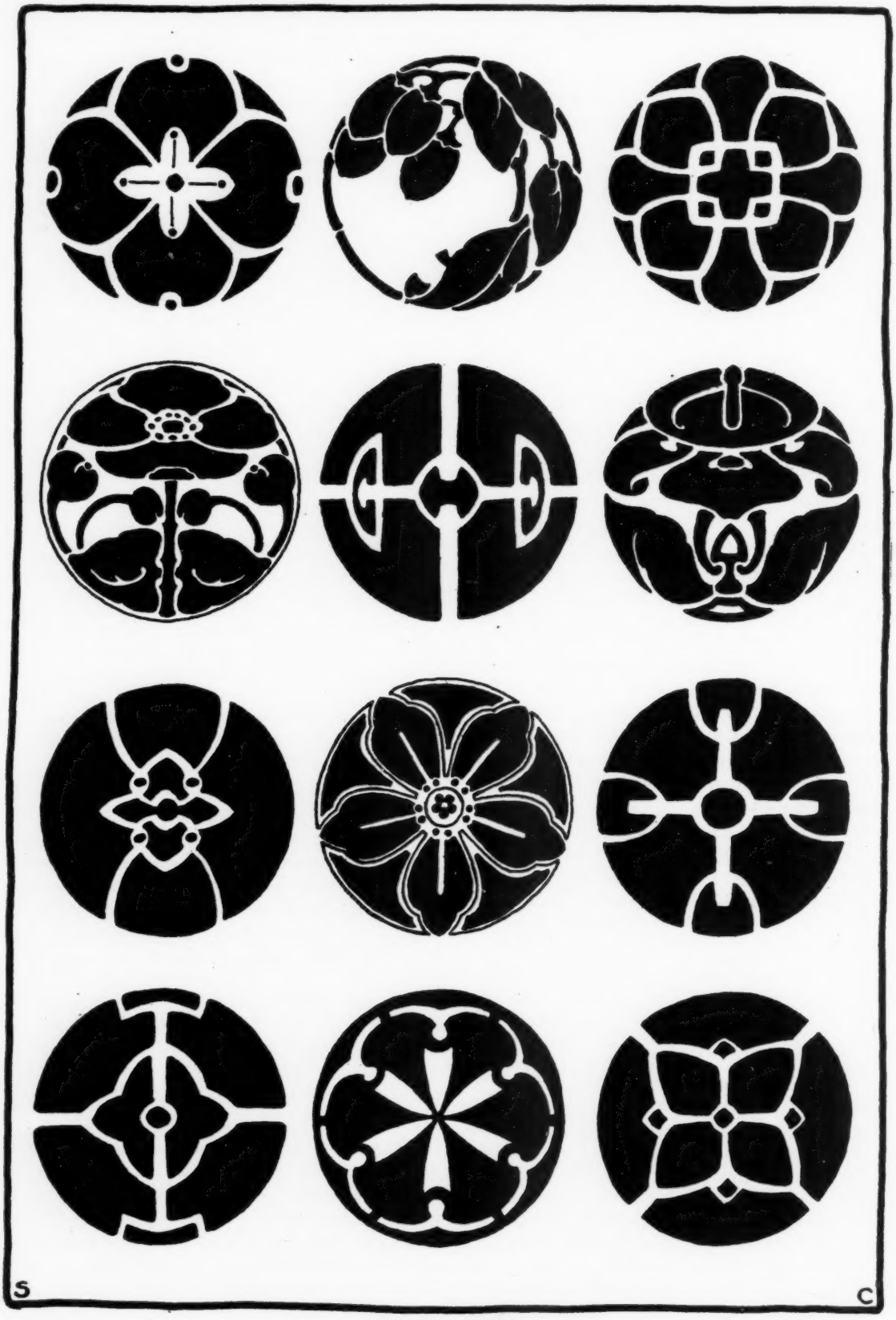


PLATE VIII

STUDIES OF FLORAL MOTIVES IN CIRCLE FORM, BY MISS SARA COHOON, INSTRUCTOR OF ART IN THE JUNIOR HIGH SCHOOL, SPRINGFIELD, MASS. THIS IS THE EIGHTH OF A SERIES OF TWELVE PLATES.

A Household Mechanics Course

N. C. Tock, Wellsburg, W. Va.

Third Paper--Glazing, Papering, Fixing Locks.

GLAZING.

Object. To teach how to put glass in window frames.

Method of Handling. As there is very little outside material to present, the emphasis was all placed on the actual work. A few moments were spent in discussing the making of glass, which is a local industry with which almost all students were acquainted at first hand. Then the making of putty was reviewed, as told in the painting course. Tools were described and shown to the class, and the order of procedure given for note books. The class then went to the shop, where the instructor demonstrated the material given under "description of processes" and the boys set to work. Small frames had been made by the woodworking classes from two-inch strips, rabbitted, mitered and fastened with corrugated fasteners at the corners.

References, Sabin's Housepainting.

Study of Materials. A full description of the manufacture of glass should be read by the pupils in any standard encyclopedia and reported on in class. Note the use of single thick glass in small windows, double thick in larger windows, and plate and crystal plate for large windows, mirrors, car windows, etc.

Putty is made by kneading whiting, which is a form of chalk, with linseed oil. It is sometimes adulterated by the addition of marble dust or other oils which make it less cohesive and durable. If one is uncertain about the quality of his putty it is best to make it himself. White lead as added to putty for filling cracks, makes it too hard for the glazier to use. We paid ten cents a pound for putty here.

Tools. Putty knives may be secured with either flat or beveled edges. There is no choice between them.

Glass cutters may be of two kinds. The more expensive diamond is used by glaziers. It is made by setting a diamond in a steel handle.

Steel cutters, which are plenty good for the amateur, are made by setting a small revolving steel disk in a handle. It will cost about fifteen cents.

Method of Procedure. 1. Measure size of opening.
2. Cut glass to proper size.
3. Clean sash, freeing it from old putty, points, etc.
4. Place glass in frame.
5. Put points in place.
6. Putty glass into place.

Description of Processes. After the opening has been carefully measured, cut a piece of paper of the right size to fit it and use it as a pattern when cutting the glass. Use a yardstick or rule as a guide.

Hold the cutter upright just as a pencil with the notched side to the front. Run it down the line, as shown by the edge of the paper, figuring on getting the glass a little smaller than the pattern. The cutter makes a scratch on the glass. (Beginners sometimes think the glass will cut off like a piece of paper.) The cutter must not be run over the line more than once, and it is not necessary to bear down very hard. Another help is to dip the cutter in coal oil or kerosene before using. After the scratch has been made, turn the glass over and tap lightly on top with the handle of the glass cutter. This will cause it to crack through the glass, and the piece will fall off.

The sash is prepared by scraping the old putty out with a chisel, being careful not to cut the wood. If the sash is new or very dry it is best to give it a coat of paint before glazing.

After every trace of putty, as well as the points or nails, are removed, place the glass in the frame and push glaziers' points into place with a chisel so as to hold the glass in place while the putty is hardening.

Putty the glass into place. This is a process easy to do but hard to describe. The teacher had best learn it from a glazier or from practice. Special attention should be given to get neat looking corners.

Problems. We found it necessary to make small frames for practice work and then encouraged the boys to bring larger frames from home to be repaired, but many of them fixed only the small frames. As one boy said, they couldn't very well go and "bust" a glass just so as to have one to fix. Before cutting glass for the frame, boys will have to practice on some scraps.

Equipment. For a class of fifteen we found that six each of cutters and putty knives were enough. Putty, scraps of glass, larger panes, linseed oil, glaziers' points and chisels will be all the other material needed.

PAPERING.

Object. To teach how to figure amounts needed to paper room.

To teach cutting and applying of paper to walls and ceiling.

Method of Handling. The making of paper was discussed for one lesson, and it was necessary to spend two days on figuring amount of paper needed. A period was taken up in the making of paste, and then several periods were spent papering one room. Not all the pupils could work at a time, so the class was divided and some of the pupils were kept at other work until their turn came. The instructor cut, pasted, trimmed and hung the first strip of ceiling paper, and then the pupils were numbered. As soon as number one got his piece of paper off the pasting board, number two got his strip cut and pasted it while unmber one was putting his on. The others watched and lent a hand as needed. There was more confusion than usual, but no other way was found that worked. In order that all could get a chance to put on a strip of ceiling, two layers were put on. The room papered was a store room opening off the shop. The chief problem most teachers will face is the one of finding a room to paper. We were offered rooms in private homes to paper, but could work out no practical way of accepting the offer.

References. Sabin's Housepainting.

Manufacture of Paper. The following outline was developed from material found in encyclopedias:

1. The pulp mill.
    a. Location.
    b. Sources of pulp.
        1. Wood.
        2. Rags.
    c. Making of wood pulp.
        1. Preparing logs.
        2. Chipping wood.
        3. Digesting, washing, bleaching.
        4. Spreading on web belt, drying, etc.
        5. Shipping to paper mill.
    d. Making of rag pulp.
        1. Sorting.
        2. Cleaning, removing buttons, etc.
        3. Shredding.
        4. Digesting, bleaching, washing.
        5. Spreading on web, etc.
        6. Usually made into paper in same mill.
2. The paper mill.
    a. Location.
    b. The beater.
    c. Sizing.
    d. The paper machine.
    e. Drying.
3. Varieties of paper.
    a. News print paper, book paper, bond paper, flats, cardboards, etc.

Equipment for Paperhanging. The class will need the following tools and supplies:

Two smooth boards for pasting. These should be about twelve inches wide. Some rougher material may be needed for staging.

Paste bucket or pan, paste brush, smoothing brush, shears, straight edge.

Method of Procedure. 1. Measure length, height and width of room and figure amount of paper needed.

2. Make paste and get equipment ready.

3. Cut paper for ceiling.

4. Mark ceiling to show where edge of paper is to come.

5. Apply paste to first strip, fold and trim.

6. Put up first strip, following line, then apply the rest of the ceiling.

7. Cut, paste, trim and apply sidewall.

8. Apply border.

Description of Processes. Finding amount of paper needed. The members of the class had learned several ways of doing this but few of them got the same answer for any given problem, so they were drilled for two days on the following method, which gives good results:

1. Divide perimeter of room by one and a half feet to find number of strips needed.

2. Divide length of a roll (48 feet) by height of room to find number of strips that can be cut from a double roll which is the unit usually used.

3. Divide result from (1) by the result from (2) to find the number of double rolls needed.

4. Find how many rolls are needed for the ceiling.

No allowance is made for doors or windows unless they cover a great deal of space. Recommend the purchase of extra paper to make up for spoilage and matching.

Cutting paper. Unroll paper from left to right, face up. Allow for matching and cut or tear off along edge of straight edge. Unroll second strip on top of first and proceed until enough has been cut. In class we cut only one strip at a time as noted above.

Marking the ceiling. It is a help to mark on the ceiling a line to locate the edge of the first strip of paper. This strip must extend down the sidewall for two inches or so. Make a line sixteen inches from the wall with a chalked cord or with a straight edge.

Making the paste. The paste may be made before cutting the paper just as well.

To about a quart of flour, add slowly enough cold water to make a smooth creamy batter of about the same consistency as pancake batter. This must be reasonably free from lumps. Slowly pour in boiling water, stirring vigorously the while, until the paste suddenly thickens and gets clear. Add enough water so it will be stirrable and put on to cook for a minute. If it is not smooth it should be strained through a sieve, but as a rule if it has been well stirred while putting in the hot water, it will be smooth enough. If there is some danger of it not sticking, a little glue may be added. Thin with cold water until creamy. Too thick a paste will crack the paper when it dries.

Pasting the paper. Turn all the paper over at once. Pull the top sheet even with the edge of the board so as not to get any paste on the front edge of the lower sheet and apply the paste generously to the paper. Fold ends to center and trim off the front edge with shears.

Applying paper to ceiling. If the instructor has been out of practice it will be well for him to get back into shape before he demonstrates to the class how to hang the first strip. Stand on the stage with the back to the wall and unfold the left end of the paper. Support the paper with fingers of the left hand and the brush held in the right hand. Press the paper against the ceiling, lining it up with the guide line, and with a sweep of the brush to the right press as much of it against the ceiling as you can. Quick work is necessary. Brush the left end against the ceiling and then walk toward the right wall, brushing as you go. When the folded part is reached unfold it. The operation is not so difficult if one keeps his back to the wall to get started and if the ceiling is in good condition so the paper will stick.

The rest of the ceiling is applied in the same way except that care is taken to match with the strip on the ceiling. Two people can work together. One person pastes and trims and the other puts the paper on. The boys will need their overalls and caps.

Papering sidewall. If the top edge is to be covered by a border the paper is cut the same as the ceiling. If a drop ceiling is used, the top edge will have to be matched before it is pasted. Use a steel square for marking the cutting line. Begin next the door and keep edges matched at all times. Some paperhangers start a new strip at each door and window, breaking the pattern when fitting in the pieces over the window. This is all right for plain papers but is not suitable for figured papers. At the baseboard, crease the paper into the corner with the shears and then take it out and cut it off.

Applying border. The only suggestion is to begin about a foot out from the wall in the darkest corner so that a good job will result in the corner.

Problems. These have been suggested by the above:

1. Pupils will figure amount of paper needed for various rooms about the building.

2. Figure amount of paper needed for the room they are going to paper and then purchase it, making a large allowance for waste.

3. Paper a room.

4. Make paste for above job. This can be done the second day of papering. Each pupil makes a small quantity. The paste made as a demonstration by the teacher will be enough for the first day.

LOCKSMITHING.

Object. To teach how to repair and set mortise, rim and night locks.

Method of Handling. No references were available so there was no outside material to give except what was found in the encyclopedia. The history and structure of locks were explained from this source. Then the class was sent to the shop and, after a demonstration, was set to work cutting mortises in two by fours preparatory to setting a lock in each. The locks were taken apart by the instructor and the pieces put in a box. After the mortise was cut the pupil put the pieces together and brought the completed lock to the teacher for approval.

Equipment. A supply of mortise locks will be needed, about one to three pupils. They will cost about 75 cents apiece. Other shop tools such as brace and bit, chisels, mallets, screwdrivers, etc., will be needed.

History and structure of the lock. The following outline was developed from the material in the encyclopedia and explained as fully as possible by the use of drawing and locks which had been taken apart to show the structure.

1. **Early locks.**
   a. **Egyptian, Roman, Greek.**
2. **Medieval locks.**
   a. **Ward locks.**
3. **Modern locks.**
   a. **Lever tumbler locks.**
   b. **Cylinder locks.**
   c. **Combination locks.**

It is well to have a variety of locks on hand to show the mechanism of each sort. We had rim locks, Yale locks, mortise locks of the lever-tumbler type, and a few locks pupils brought to be fixed. Quite a few asked questions about how a night latch worked, but we had none to take apart and investigate.

Repairing locks. The chief trouble that happens with locks is the breaking of the spring which holds the latch out so as to keep the door closed. Take the lock carefully apart by loosening the screw that holds the plates together. A little investigation will show where the trouble lies. Some locks use wire springs and others use flat springs.

Corset steel will do in one case, stiff wire in the other. A new spring is easily made and inserted.

The lock should be cleaned before putting back into shape.

Setting a Mortise Lock. 1. Locate height of door-knob above floor by marking with pencil 36 inches above the floor.

2. Lay out rectangle on edge of the door with gauge and trysquare, of the proper size to take the lock.

3. With an auger bit of the right size bore holes within the rectangle as deep as the lock is wide. Take out all the wood possible by setting the holes close together.

4. With a chisel and mallet trim the mortise smooth so the lock will fit in firmly and smoothly without having to be hammered in. Face plate is to fit flush with surface.

5. Bore a three-quarter inch hole for handle shank in the proper place.

6. Bore two smaller holes close to each other for the key hole. Trim out with narrow chisel.

7. Drop lock into place and put in screws.

8. Try the knob and if the latch works all right, slip escutcheon plates over handle shank and place key in lock through the plates. This will insure the plates being properly lined up. Screw them on.

9. Fasten plate to jamb, cutting out wood beneath it if necessary to make room for the bolt.

Setting a Yale Lock. Set a Yale lock according to the directions which come with the lock. There are so many different kinds and they are so easy to put on that it is not necessary to give much time to the teaching of it.

Problems. The problems have been suggested above. It is hardly practical to provide a door for every lock so our class set their locks in a short piece of two by four. A piece of two by six would have been better as some of the boys cut the holes way through the boards, spoiling the appearance of the job.

The locks were given the boys in a knock-down condition and they had to put them together and hand in the board with the lock set in it and in working condition. The plan was to have the class hinge the board also but time was too short to allow it. This could very well be put into the course here.

A great many locks were brought from home to be repaired and boys reported fixing some without bringing them along. All the locks about the school were examined and those needing it were repaired.

NOTES FROM OAKLAND TECHNICAL SCHOOL, OAKLAND, CALIFORNIA.

J. A. Robison, Head of Vocational Department.

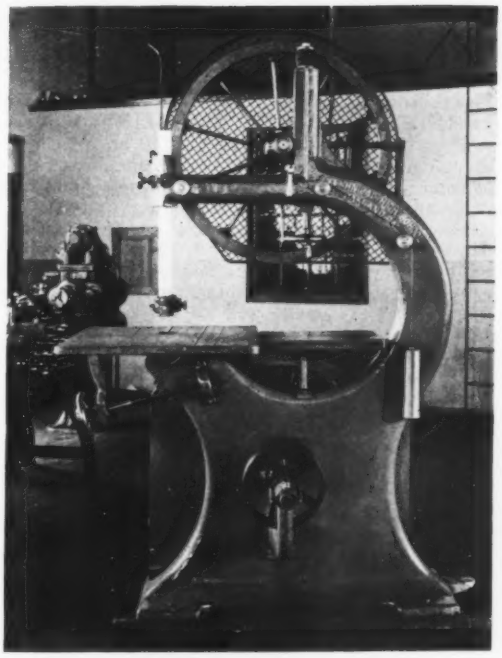
A great deal has been written in regard to courses of study and outlines of work in vocational schools in various parts of the United States. All of this has been enlightening as well as interesting.

We are all interested in what others are doing; so, perhaps, others may be interested in some of the many things which have been done, and also in those we are now doing at the Oakland Technical High School, Oakland, California.

This school was one among the first schools in California to organize classes under the Smith-Hughes Act. We are at present running thirteen classes under that law and expect to have four others in operation next year, two in sheet metal and plumbing and two extra classes in auto repair.

Our classes as now organized are: Four in machine shop practice, one of which is taking forge work; three in auto repair, one of which is taking forge work; three in electrical work, one of which is taking carpentry; one in carpentry and mill cabinet work; and two in pattern work.

Aside from the Smith-Hughes classes we have two classes in general machine-shop practice and two regular cabinet classes.



BAND SAW MADE BY STUDENTS OF OAKLAND TECHNICAL HIGH SCHOOL.

The men in charge of these shop classes are men who have served their apprenticeship and have worked as journeymen in their particular lines. Several of our teachers of related subjects have been connected with large concerns as specialists. At the present time we have nineteen teachers in the vocational department.

It is a well-known fact that classes organized under the Smith-Hughes Act must do work of a practical nature and of such a grade that it will satisfy the trade. We have had little difficulty along this line, as far as the securing of work of a practical nature is concerned, since a great many jobs are furnished us by the school board. A school system in a large center is always in need of something which can be produced by our various shops, such as cabinets, patterns, motor repairs, rings for basket ball goals, chains and rings for playground department, automobile repair and new machinery to make.

Our machine shop recently made seven drill presses for a local firm who were willing to put them on the market for us.

Another machine constructed by the machine shop department is a band saw. The patterns were made by the boys in the pattern shop and, after the castings were made, the machine shop did all the work required to put the machine in working order. We are using it now in our cabinet shop.

During the closing months of the last school year the cabinet shop boys built two mahogany office desks and the following articles were made of figured red gum: Two office desks, four chairs, one filing cabinet, two swivel chairs to match, and a typist chair. We made for the Baby Hospital Association of Alameda County the following: One high plinth, one low plinth, one bom-cabinet, one three-sectional barstalls, two high stools, two low stools, two foot boards.

The cabinet shop recently made the following for the D. T. Block Employment Agency, whose offices are in the First Bank of Savings Building, Oakland, California: One office desk, one typewriter's desk, twelve chairs, one filing cabinet, two tables and a mimeograph table.

ONE HUNDRED PER CENT USE OF THE INDUSTRIAL-ARTS MAGAZINE.

Francis E. Mack, Instructor, Advanced Woodworking, Junior High School No. 1, Trenton, N. J.

Has this ever happened to you? In some former issue of the INDUSTRIAL-ARTS MAGAZINE you came across an article which appealed to you, an article that you thought you might read again? Or there was a drawing of some project, which you decided you could make use of at some future time? You now find that you want that article or project, but you cannot remember in what issue it was. So you start to hunt through your pile of magazines, and you either give up, after looking through a few, or you get reading some other interesting article,—in either case, you do not get what you started after. I believe that this has happened to almost every shop man at some time or other.

PART OF THE FURNITURE MADE BY STUDENTS OF TECHNICAL HIGH SCHOOL, OAKLAND, CALIF., FOR A LOCAL BUSINESS OFFICE.

In the Trenton Junior High School there are shops for elementary woodworking, printing, metal working, cabinet making, and mechanical drawing. We very often come across material useful to us in the INDUSTRIAL-ARTS MAGAZINE, and we have had the experience mentioned above. The INDUSTRIAL-ARTS MAGAZINE is replete with articles, projects, and drawings of interest and use; especially are there some fine articles dealing with the educational features of shop work.

To obviate the loss of time and energy wasted in the haphazard way mentioned, the shop instructors put their heads together and decided that we would make a card index of the topics, articles, drawings, etc. In the print shop, the instructor had the boys set up and print cards, like the following, sufficient for each shop. You will notice that the card is so arranged that its use may be expanded, if desired, to include other magazines or books.

In the woodworking shop, containers were made, each container sufficiently large to hold one volume. We have six complete volumes of the INDUSTRIAL-ARTS MAGAZINE, beginning with September 1916 and concluding with August 1921. With the next issue of the INDUSTRIAL-ARTS MAGAZINE, we shall complete our seventh volume. We used a card 3 x 5 in., and made a suitable box with compartments for cards for each shop.

With everything in readiness, the next and most laborious job was the combing of the volumes for selection of our material. By using the tables of contents, we were enabled to eliminate matter foreign to our work. Other material we looked up, and read excerpts, to determine how useful it was. To do this required judgment, as we did not wish to discard anything we could use, nor did we want to index material which was not of interest. However, we completed the job, and we now have a systematic time-saving scheme for making one hundred per cent, or nearly so, use of the INDUSTRIAL-ARTS MAGAZINE. As our copy of each issue comes to us, we transfer to the cards, thus keeping up-to-date. An especial compartment is given over to the educational articles and editorials, a compartment containing reference to topics of interest to all shops.

As an example, in the compartments for woodworking, one card is headed, wood-turning, and the card shows references to the years, months, and pages of any topic or drawing in wood-turning. Likewise, wood-finishing, period furniture, toys, birdhouses, etc., etc., are thus indexed. The same treatment is given the other shops. In the metal shop, during the study of electricity, the topic, "electric motors" is taken up. In the card index box is found a card entitled "electric motors" and all references given.

We do not wish to imply that we build our course of study around projects, found in the various magazines, but that we use them to supplement our work, and enrich our line of projects. Any wide-awake instructor will make use of any material that will help him, and we believe that by indexing these volumes, that we have something that is very valuable, and well worth the effort expended. As a final statement, we consider the recent articles on organization of shop work for Junior High Schools of especial merit.

WOOD
TOPIC

Book or Magazine	Month	Year	Page
Book or Magazine	Month	Year	Page
Book or Magazine	Month	Year	Page
Book or Magazine	Month	Year	Page

PROBLEMS AND PROJECTS

The Department of Problems and Projects aims to present each month a wide variety of class and shop projects in the Industrial Arts. Successful problems are invited and will be paid for. A brief description of constructed problems, not exceeding 250 words in length, should be accompanied by a good working drawing. The originals of the problems in drawing and design should be sent.

Problems in benchwork, machine shop practice, turning, patternmaking, sewing, millinery, forging, cooking, jewelry, bookbinding, basketry, pottery, leather work, cement work, foundry work, and other lines of industrial-arts work are desired for consideration. The editors will not accept the old hackneyed problems of footstools, taborets, towel holders, etc., which have been made from time immemorial, ad nauseum.

Drawings and manuscripts should be addressed: The Editors, INDUSTRIAL-ARTS MAGAZINE, Milwaukee, Wis.

A SIMPLE PHONOGRAPH.

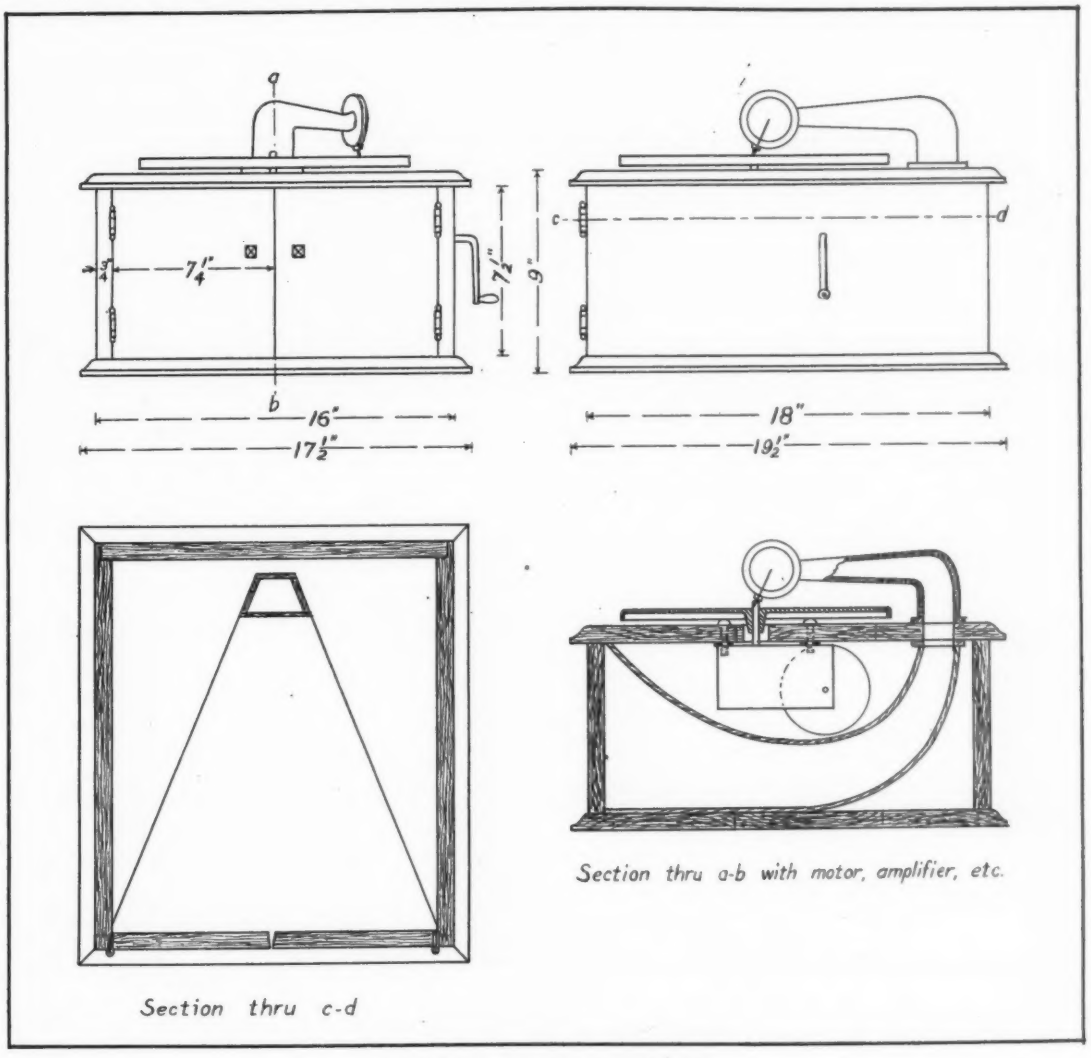
E. M. Winterbourne, Silver City, N. M.

In manual training classes, as in other classes, the quality of the work, and the spirit with which the student attacks a problem, is dependent to a great extent, on the interest which can be instilled into the problem. The teacher who can intelligently take advantage of this interest will find his teaching constantly improving, and he will be on the upward road instead of getting into a rut. It is a poor teacher who has the same designs and pieces of furniture year after year.

There are many projects for the furniture construction classes which will hold the interest and call forth the student's best efforts. One of the most popular, and, at the same time, one involving painstaking and careful work, is the phonograph. This project, from the simple box type to more pretentious upright and console models, is not too difficult for high school boys. If reasonable care is taken in the work, the appearance and tone of the instrument will oftentimes surpass the manufactured article.

In this paper is shown the construction of a very simple phonograph which can be made by an advanced eighth-grade or a ninth-grade student. The designs and dimensions given are only suggestions. The student should have access to a number of designs or pictures, and should be encouraged to design his own.

Any good cabinet wood is suitable for the case, but spruce or clear white pine should be used for the amplifier or horn. After the stock bill has been made out the stu-



DETAILS OF A SIMPLE PHONOGRAPH.

dent may start the work with the top and bottom pieces. These should be jointed, dowelled and glued. They should be then dressed down to the proper thickness, free from warp or wind, and the edges rounded or chamfered. If the shop equipment includes a universal plane, a simple molding may be run on the edges.

The back and side pieces and the doors may now be cut to size. The back and side pieces should be jointed, using the rabbet joint, as shown in section. The ends which come to the front should be carefully block planed.

In gluing these members together, it is well to use triangular corner strips to strengthen the back corners. They are made by ripping a piece of pine 1¼"x1¼"x7" on the diagonal.

After the glue has set, this member should be placed on the bottom piece and carefully marked to locate the position. Be sure the distance between side pieces is the same at the front as at the back. Now turn it over and fasten the bottom on with screws 2¼" by No. 10 F. H. B. Countersink for the screw heads. The top may be fastened with round head nickel screws of same size, but should not be fastened permanently until the other work of construction has been finished, and the amplifier and motor are in place. The doors may be hung now, or if preferred a simple grill with silk glued to the back may take the place of the doors.

Our next problem is the construction of the amplifier. Spruce wood of about 3/16" to ¼" thickness should be used. It is best to cut a paper or cardboard pattern for the pieces, as in this way you may be sure you have the proper shapes. They should be glued and fastened together with flat-head wire nails about ¾" by No. 20.

The mouth of the horn should be fastened into the cabinet by means of a strip of wood between the side pieces. A hole the size of the opening in the tone arm base should be made in this strip, and the mouth of the horn should come just under this hole. A strip of felt glued over the supporting strip will prevent blasting on the high notes. Another strip of felt should be placed between the horn and the bottom of cabinet along the front edge, and the horn fastened by means of small wire nails.

There are several companies which supply motors and tone arms, and these furnish complete directions for installing. In the selection of equipment get the best that you can afford. Don't economize on the tone arm and reproducer, as on these depend to a great extent the tone of your instrument.

MECHANICAL DRAWING PLATE CABINET.

F. W. Walsh, Oshkosh, Wis.

Places in which mechanical drawing students may deposit their finished mechanical drawing plates until they are graded by their instructor are not, ofttimes, very satisfactory. The cabinet shown in the drawing is the result of several trials of devices to take care of this matter. The cabinet is made up of three compartments, two for drawing plates at the left, and one for a standard letter file at the right. The upper compartment is for receiving plates, and the lower compartment serves as a place for holding graded plates until the time when the instructor decides to return them to the students. The cabinet takes plates up to twelve by eighteen inches in size and will accommodate one hundred students, nicely.

When plates are once deposited in the cabinet, they are kept clean, and safe from the eyes of lagging students until the cabinet is unlocked by the instructor. However, a student may know his progress and standing at any time by consulting his record sheet.

OSHKOSH STATE NORMAL

MECHANICAL DRAWING DEPARTMENT

INDIVIDUAL RECORD of _____

_____ Class Clock or File No. _____

Term_____ Year_____ Grades

Plate	Let.	Description of Plate	Time	5	6	7	8	9	10
1.									
2.									
3									
4.									
5.									
6.									
7									
8.									
9									
10.									
		Mid-Semester							
11.									
12									
13.									
14									
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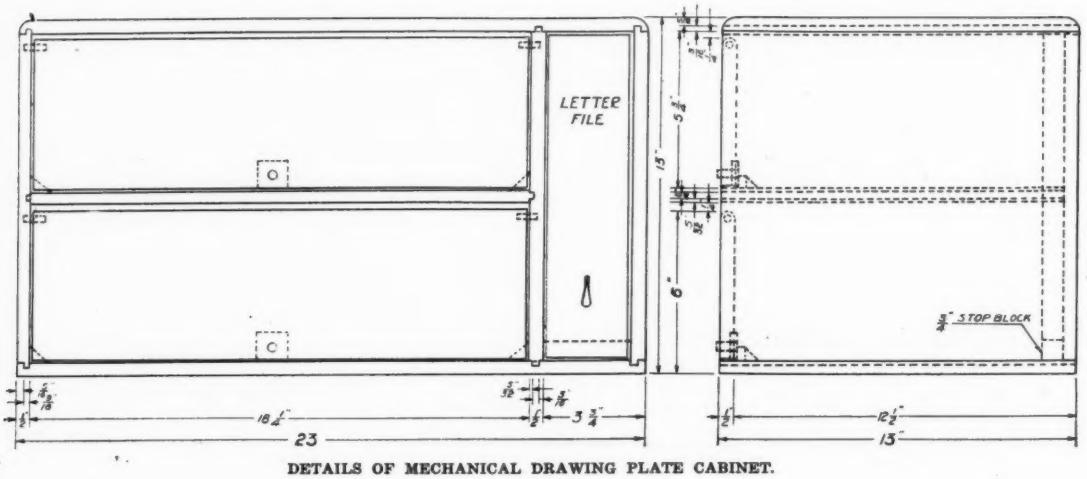
16.									
17.									
18.									
19.									
20									
21.									
22									
23									
24.									
25.									

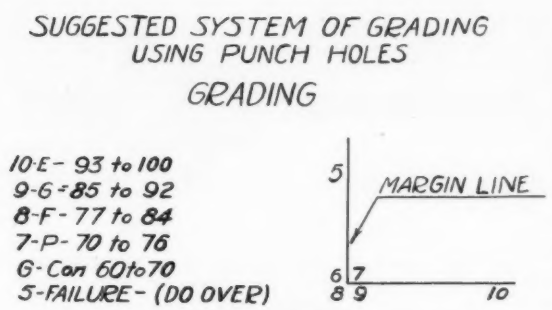
Date_____ Hours_____ Grade_____ Credits _____

Instructor_____

FORM FOR STUDENT'S RECORD.



DETAILS OF MECHANICAL DRAWING PLATE CABINET.



PLAN FOR GRADING.

Columns for monthly grades and dates of completion of plates may be added to the student's individual record sheet in case that information is needed. A copy of a typed student's individual record sheet which is filed in the letter file and a word-for-word copy of the sheet of "general directions" which explains how to use the file and cabinet follow.

General Directions for Keeping of Student's Record.

Secure a student's individual record sheet from your instructor and fill in the desired information with pen and ink. Place your family name first, follow with your given name and initial. File your record sheet at once in the letter file in the drawing plate cabinet above the letter of your name and in alphabetical order with the other names above your letter. After you have completed a lettering card, which is due each week, make a check mark in the upper left-hand corner of the rectangle under "Let" and opposite the number corresponding to the number of your lettering card; then return the record sheet to the letter file. As often as you complete a drawing plate, write in its descriptive title under "Description of Plate" and the total time in minutes required to finish the plate and answers to questions on the plate under "Time."

A plate should be clean and trimmed before handing in to be graded. All plates, answers to questions and lettering cards should be deposited, right side up, through the top slot in the drawing plate cabinet.

In grading your plates they will be punch-marked around the lower left-hand corner of the border line. The punch marks have relative values, as shown by the system shown on the blueprint or on the insert drawing. The grades will be checked off on your record sheet under the proper grade by check marks, letter or any mark which the instructor may choose to use.

This record is to be kept mostly by you and should be an accurate account of your work. It will be filed at the end of the year in the mechanical drawing office as a permanent record.

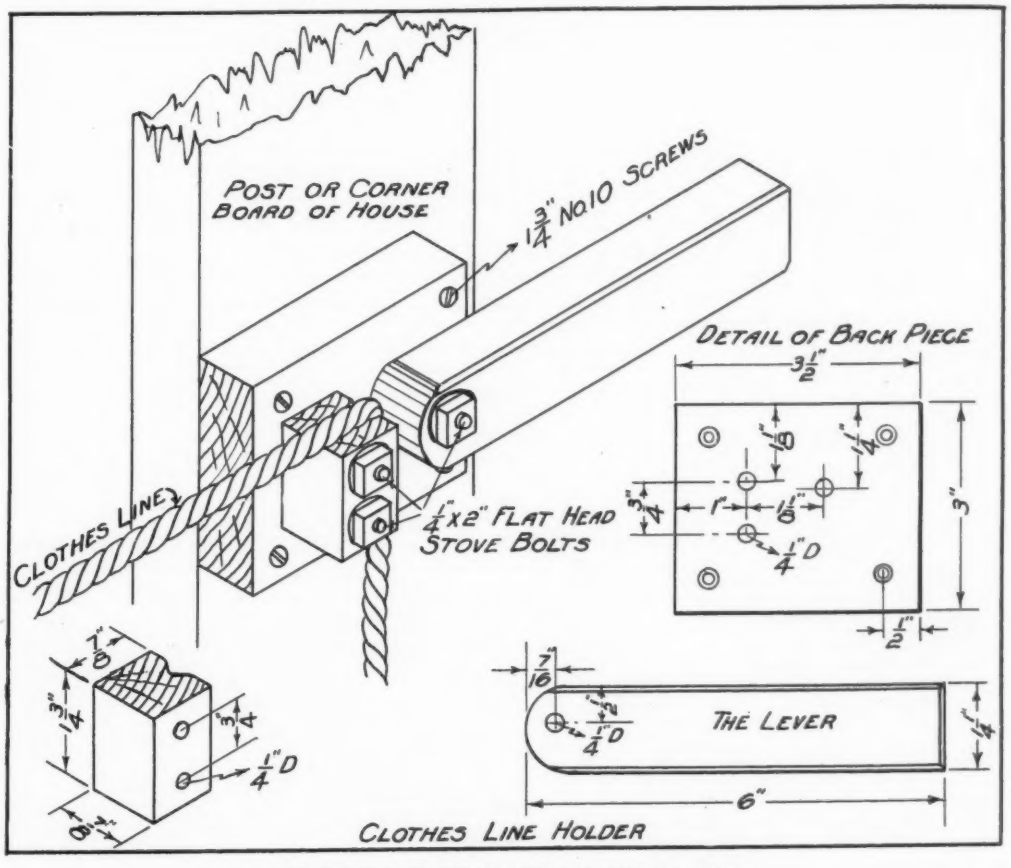
CLOTHES LINE HOLDER

L. M. Roehl, Ithaca, N. Y.

The clothes line holder shown in the drawing requires the following material:

One piece of hardwood for the main or back member $\frac{7}{8}$"x3"x3$\frac{1}{2}$"; one piece of hardwood $\frac{7}{8}$"x$\frac{7}{8}$"x1$\frac{1}{2}$" for the brace; one piece of hardwood $\frac{7}{8}$"x1$\frac{1}{4}$"x6" for the lever. Three $\frac{1}{4}$"x2" flat-head stove bolts. Four 1$\frac{3}{4}$" No. 10 flat or round-head wood screws.

It is very essential that the bolts which hold the brace and lever to the back be accurately placed, as shown in the detail dimensioned drawing of the back piece. The bolts which hold the brace are placed 1" from the end of the back piece, $\frac{3}{4}$" apart and the upper one 1$\frac{1}{8}$" from the top edge. The bolt for holding the lever is placed



DETAILS OF A HANDY HOLDER FOR CLOTHES LINE.

1⅛" from the other bolts and 1¼" from the top edge of the back piece. The hole for the bolt through the lever is placed ½" from the top edge of the lever and 7/16" from the end. This is off center and causes the end of the lever to work as an eccentric firmly pressing and clamping the rope against the brace as the lever is brought down. The edges of the lever are chamfered. It may be rounded where the hand grips it if so desired.

It should be noted in the detail drawing of the brace that a small groove is made in the side of the brace for the rope to drop partly in as the lever presses it.

The heads of the stove bolts are countersunk at the back side of the main piece so as to allow it to fit tightly against a wall or post. The ends of the bolts should be slightly riveted so as to prevent the nuts from falling off.

The holder is fastened to a flat surface on a post or on the cornerboard of a house or other building by use of four wood screws. Either flat or round-head wood screws may be used.

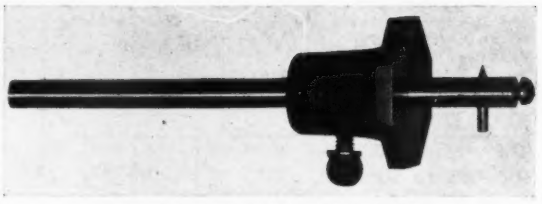
The holder may also be used to hold the rope which holds a trap door or hinged stair, or it may be used in other similar places when the rope is not fastened permanently.

MARKING GAUGE.

Geo. W. Berg, Milwaukee, Wis.

The marking gauge is a bench metal working problem that affords practice in accurate filing, drilling, reaming, and tapping. It is a useful, handy, and attractive tool when finished and can be made at a low cost.

The head or block is cast of soft gray iron; the beam is of cold rolled steel. The pattern for the head casting should allow 3/16 inch for finish on the large flat face which is to be finished by chipping and filing. The remaining finished surfaces are to be ground and filed and do not need as much allowance for finish in the pattern.



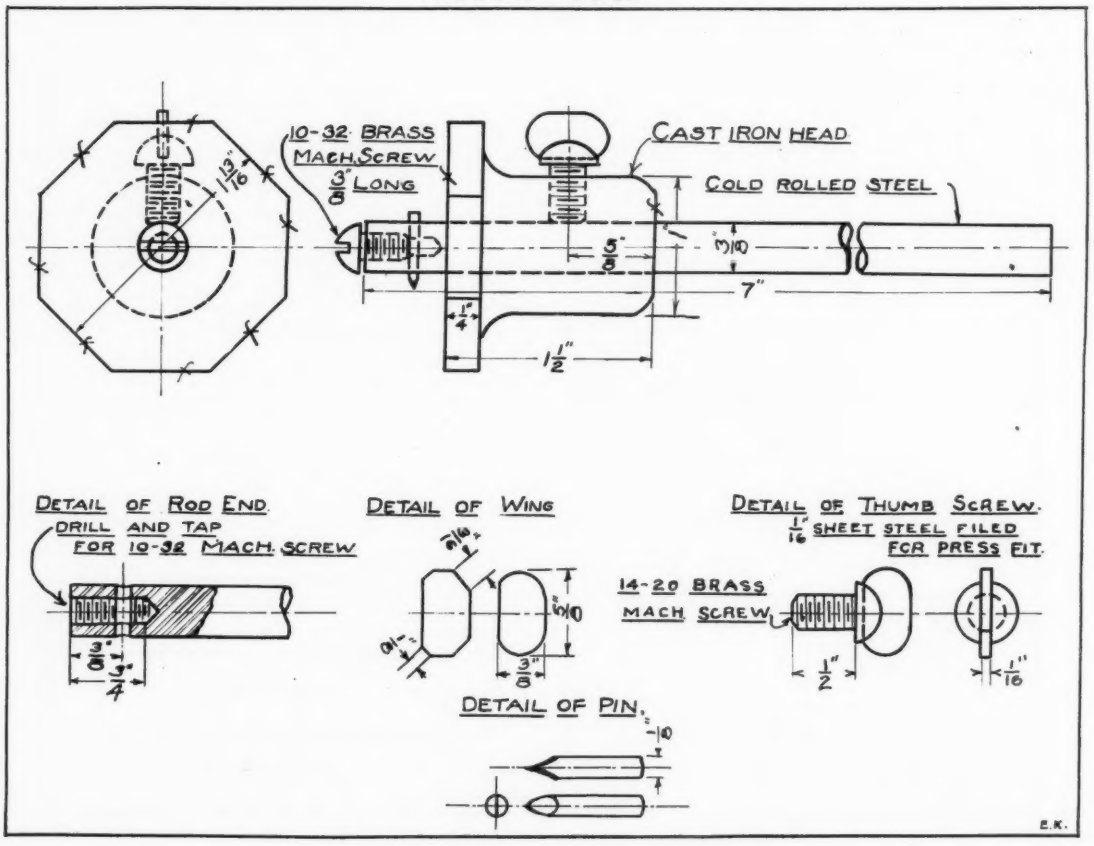
THE COMPLETED MARKING GAUGE.

The drawings suggest the steps in finishing the head. In making the templet file first to a perfect square and then to an octagon. Extreme care must be exercised in drilling the hole in the templet so that it is in the exact center when finished. The flat surface should be coated with blue vitriol before scribing around the templet and a sharp scriber should be used, as the student should not have the use of the templet after starting to file the octagon. The sides should be filed to the lines in the order indicated on the drawing. The size may be checked by calipering the short diameter of the octagon and by measuring the sides. When the short diameter is 1-13/16 inches, as indicated in the drawing, the sides should measure 3/4 inch, as this distance works out mathematically to .7503 inches.

The marking pin should be made of drill rod and may be hardened. It can best be sharpened by grinding on a smooth wheel before cutting off to length from the rod. To do this hold as in sharpening a plane iron and rotate slightly when grinding each side.

The wing for the thumb screw may be further secured after pressing in place by holding the screw in the vise and peening the metal of the screw around the wing with a blunt chisel ground slightly concave so as to fit the shape of the head of the screw.

MARKING GAUGE



A PRACTICAL DESK CALENDAR.

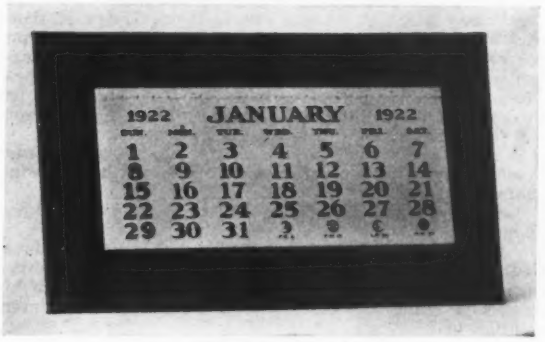
Harriet M. Higgins, Springfield, Mass.

Material:

1 base pulpboard, 3"x5¼";
1 cover, colored paper, 4"x6¼";
1 lining, colored paper, 2¾"x5";
1 standard jute tag, 2¼"x3¼";
1 cover for standard, colored paper, 5"x5¾";
1 intermount, black paper, 2"x4¼";
1 calendar, 1¾"x4".

Draw lines one-half inch from all edges of cover 4"x6¼". Fold lines. Paste base to cover (lines indicate location). Miter corners of cover to within one-fourth inch of base pulpboard. Paste one-half inch edges of cover to back of base (give attention to double thickness of corners). Paste the piece of colored paper 2¾"x5" to line the back of base. Paste the intermount in center of face of base, one-half inch margins on all sides. Paste the calendar pad in middle of the intermount.

On jute tag standard draw a line 1¼" from one 2¼" edge. Score and fold this line. On 5"x5¾" colored paper draw a line 1¼" from a 5¾" edge. Draw a line 1½" from the opposite edge. Draw a line two inches from one five inch edge. Draw a line one-half inch from the opposite edge. Draw a line 1¼" from the one-half inch line. Score the last line drawn. Paste the jute tag to the 2¼"x3¼" rectangle so that the scored line of the jute tag corresponds to the scored line of the cover paper. Paste the 1½"x5¾" part of cover paper to the back of jute tag and to the one-half inch and two inch parts of cover paper. Paste the 1¼"x5¾" part in the same way, thus making a piece 2¼"x5¾". Fold standard at scoring and at the top and bottom of jute tag. Paste the ½"x2¼" part to the 2"x2¼" part to make a triangular standard.



DESK CALENDAR.

Paste the 2"x2¼" paper side of standard to back of base, 1½" spaces at each end of standard and lower edge of standard flush with lower edge of base.

WHAT A SUPERVISOR EXPECTS TO FIND WHEN HE COMES TO HIS SCHOOL.

A supervisor's duty is to "supervise." But what is meant by the word "supervise"? In Webster, the following definition is found. To look at attentively, to oversee, to direct with authority.

Three distinct things stand out in this definition:

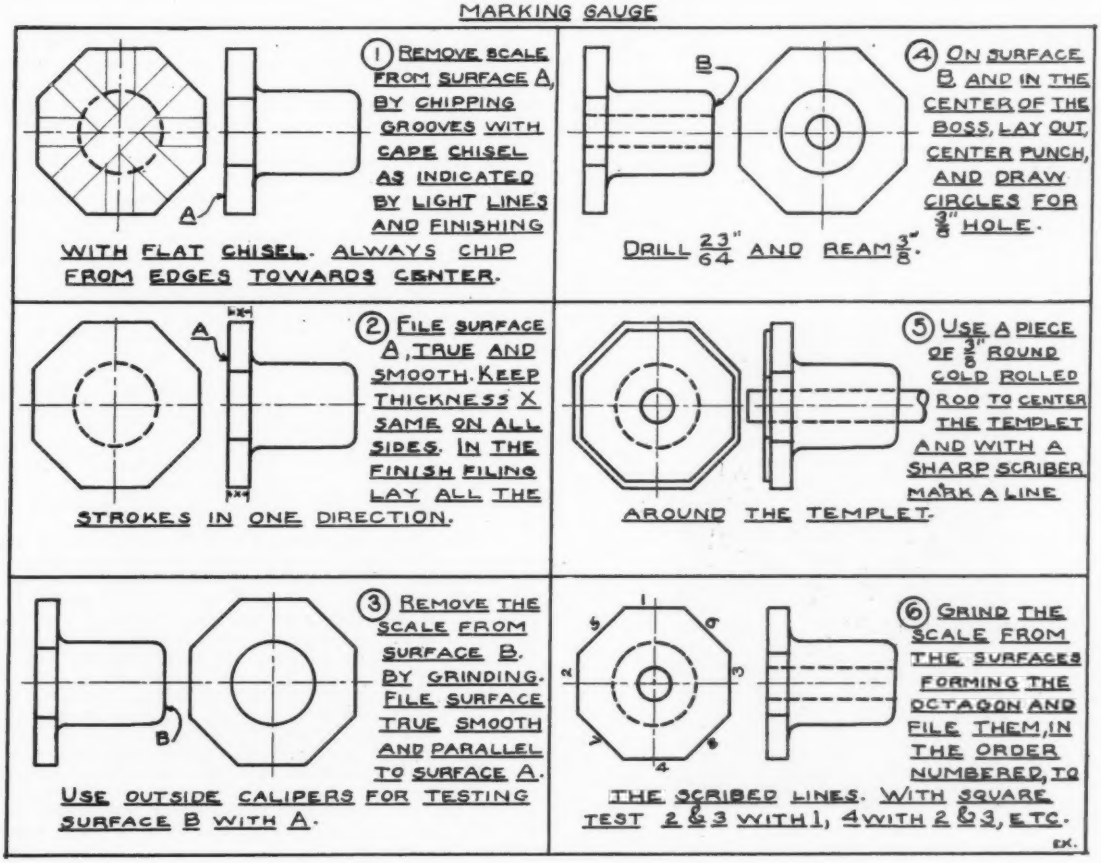
First. Attention to details.

Which may be said to mean systematic check upon attainments and deficiencies in the special work for which supervision has been instituted.

Second. To oversee.

Which may be said to mean that there must be definite aims and plans of the special work under supervision, and that these plans are carried out and the aims realized.

MARKING GAUGE


1 REMOVE SCALE FROM SURFACE A, BY CHIPPING GROOVES WITH CAPE CHISEL AS INDICATED BY LIGHT LINES AND FINISHING WITH FLAT CHISEL. ALWAYS CHIP FROM EDGES TOWARDS CENTER.
A
2 FILE SURFACE A, TRUE AND SMOOTH. KEEP THICKNESS X SAME ON ALL SIDES. IN THE FINISH FILING LAY ALL THE STROKES IN ONE DIRECTION.
3 REMOVE THE SCALE FROM SURFACE B. BY GRINDING. FILE SURFACE TRUE SMOOTH AND PARALLEL TO SURFACE A. USE OUTSIDE CALIPERS FOR TESTING SURFACE B WITH A.
B
4 ON SURFACE B AND IN THE CENTER OF THE BOSS, LAY OUT, CENTER PUNCH, AND DRAW CIRCLES FOR 3/8" HOLE. DRILL 23/64" AND REAM 3/8".
5 USE A PIECE OF 3/8" ROUND COLD ROLLED ROD TO CENTER THE TEMPLET AND WITH A SHARP SCRIBER MARK A LINE AROUND THE TEMPLET.
6 GRIND THE SCALE FROM THE SURFACES FORMING THE OCTAGON AND FILE THEM, IN THE ORDER NUMBERED, TO THE SCRIBED LINES. WITH SQUARE TEST 2 & 3 WITH 1, 4 WITH 2 & 3, ETC.
EX.

Third. To direct with authority.

Which may be said to mean in the language of those who wrote it: "He taught them as one having authority, not as scribes." Not according to personal beliefs and opinions. Thus the teachers are assisted, as nearly as possible, to understand the principles and laws which will lift them out of limitations and eventually liberate them from fear and ignorance of the work in question.

It is quite generally agreed that a supervisor, in order to efficiently fulfill his duties, should possess the following characteristics:

A. A specific knowledge of and skill in the subject in his care.

B. A general knowledge of the entire field of education in the group of schools in which he works, in order that he may properly understand the **Right** relation of his subject to other subjects in the curriculum and the interrelation of all.

C. He should be a humanitarian, with a knowledge of children, men, industries and society. One, more or less locally, nationally and internationally recognized as regards skill and attainment in his line of work.

D. He ought to have a knowledge of the relation of his work to the locality, the state, to the nation and its international relation and significance.

E. He must have and set up right standards in his line of work, and assist others in attaining these standards.

These statements of the duties and qualifications of a supervisor of a special subject lead to the question "What does a supervisor expect to find when coming to a school?"

Having performed his duties according to principles already outlined, definite results should be noticeable.

Therefore a supervisor should expect to find:

First. Adherence and conformity to instructions; plans carried out and aims attained.

Second. Evidence of a reasonable progress along definite lines.

Third. An increased state of happiness as a result of work and progress.

This implies growth, which is Life. It also evidences the fulfillment of Law, without which there is no growth. The fulfillment of Law is Love.

—C. A. Kunou, Los Angeles, Calif.

DEATH OF MR. CARMAN.

Mr. Kenneth V. Carman, instructor in industrial arts education at Teachers College, Columbia University, died July 17th, 1922, after a brief illness of typhoid and pneumonia. Mr. Carman was a native of Stockville, Nebr. He was reared in Cambridge, Mass., and was graduated from the Rindge Technical High School. Later he received a diploma from the Massachusetts Normal Art School in Boston and the B. S. and M. A. degrees from Columbia University. His teaching included work as an instructor in the Rindge Technical High School, as supervisor of industrial arts at Wellesley, Mass., and at Westfield, N. J., as professor of industrial education at the State College, Pullman, Wash., and as director of vocational education at Richmond, Indiana. During the World War he served on a commission appointed by the government to select sites for camps to train soldiers in industrial work. He was an instructor at Teachers College for three years. At the time of his death he was engaged in writing a series of booklets for the Life Planning Institute, analyzing the various industries. Mr. Carman was married last September to Miss Louise Brassell of Memphis, Tenn. Mrs. Carman was graduated from the art department at Teachers College.

KENNETH V. CARMAN.
Died July 17.

MR. JENSEN RESIGNS.

Professor George Henry Jensen, head of the Department of Vocational Education of the University of Washington, and state supervisor of vocational education for the state of Washington, has resigned to become president and manager of the Mount Vernon Automobile Company. The firm has the agency for the Ford, the Fordson and the Lincoln automobile in one of the most fertile valleys of the state of Washington.

Prof. Jensen in leaving educational work, discontinues a most valuable and effective service which he has been rendering in the state of Washington and throughout the Pacific northwest. His decision has been universally regretted by teachers and school officials interested in the development of vocational education and vocational teacher training in Washington.

Mr. Jensen is a native of Indiana, a graduate of Valparaiso University and a former graduate student of Bradley Polytechnic Institute and the University of Chicago. His experience as a teacher of manual training and of vocational subjects is exceptionally wide. He began his professional career in the high school at Missouri Valley, Iowa, and successively taught in the Calumet, Michigan, high school, in the Central State Normal School of Michigan, in the Louisiana State Normal School, and in the Soldan high school and O'Fallon technical school of St. Louis.

In 1913, after spending a year in the study of continuation schools in Europe, he became an instructor at the University of California Summer School. He then taught for a year in the Placer County high school and was for four years head of the industrial arts and prevocational departments of the city schools of Stockton, California. In 1918, he joined the faculty of the University of Washington as assistant professor of teacher training in trades and industries and continued at the head of the department until last year. During this period, he did some special work for the United States Shipping Board as special representative of education and during two years spent one-half his time as state supervisor of vocational education for the state of Washington. During the past year, an increasing amount of his time has been taken up in handling the office of state supervisor.

GEO. H. JENSEN.
Prof. Jensen has resigned to enter business.

Mr. Jensen has done notable work in interesting the large industries in the state of Washington in foremanship and occupational training. He conducted several surveys and led in organizing classes for foremen in the lumber industry. While engaged in vocational work in Washington and in California, he was a leader in educational association work, a frequent speaker at professional conventions and a contributor to educational magazines and local publications. His decision to enter business was received with general regret by the educational people, who have become acquainted with his work.

IMPORTANT ADDITIONS TO BALTIMORE SCHOOL STAFF.

Two of the most important additions to the administrative staff of the Baltimore city schools are Mr. Charles W. Sylvester, who has become Director of Vocational Education, and Dr. John L. Stenquist, who has assumed direction of the newly created Department of Educational Research. The new appointees entered their work on September first.

Mr. Sylvester who becomes the first head of the united vocational work offered in Baltimore is a native of Illinois and has had wide experience in manual training and vocational work. He was for a time head of the manual training department at Springfield, Ill., and in 1916 became director of vocational education at Hammond, Ind. At the close of the war he resigned to become local Director of the Rehabilitation Work for the Federal Board of Vocational Education with offices in Chicago. His activities and his understanding of the needs of service men soon made the Chicago branch one of the most effective in the United States. Mr. Sylvester has been prominent as a member and officer of the Western Arts Association and the Vocational Education Association of the Middle West.

Mr. John L. Stenquist is a graduate of Teachers College and has specialized in Educational Research. As Assistant Director of the New York City Department of Research, he worked out the well known Stenquist Mechanical Aptitude Test and other tests especially adapted to determine the vocational aptitudes of boys. He is organizing in Baltimore the first Department of Research and his work will touch upon all phases of school administration and organization in the city.

CHAS. W. SYLVESTER,
Director of Vocational Education,
Baltimore, Md.

DR. J. L. STENQUIST,
Director Educational Research,
Baltimore, Md.

NEW BOOKS.

Forms, Records and Reports in Personnel Administration. Edited by C. H. Hitchcock. Paper, 128 pages. Price $1.75 net. University of Chicago Press, Chicago, Ill.

This study will interest school board members more strongly as business men and employers of labor than it will as school board officials. In brief it presents a carefully chosen series of forms and records used in a wide variety of large industrial and mercantile firms for managing the employment, training, safety, welfare and maintenance of large forces of employees.

In a sense the book takes up only the mechanics, or system, used by the management to get and hold employees and to keep these at a high point of efficiency. On the other hand many of the forms reflect the social service and the welfare work which the firms have undertaken. The author in his first chart makes very clear that in his own estimation effective personnel work involves much attention and positive work for the social well-being, education, and physical welfare of the men and women who work.

Materials of Construction.

H. E. Pulver. Cloth, octavo, 318 pages. McGraw-Hill Book Co., New York, N. Y.

While this book was primarily prepared for correspondence study in connection with the courses in engineering and building construction offered by the University of Wisconsin it strikes us as a most useful text for vocational schools and as a handy reference for industrial arts departments. The author takes up in detail the classification, processes of manufacture, properties and uses of (a) plasters and natural cements, (b) limes and mortars, (c) portland cement and cement mortars, (d) concrete, (e) stone, (f) brick and clay products, (g) timber, (h) iron and steel, (i) non-ferrous metals and (j) miscellaneous materials. Facts concerning the origin, and chemical content of materials and their manufacture is brief but ample. The emphasis is rather on the selection, use, strength and testing of the several kinds of material from the practical builders' use. The chapters on concrete are very inclusive and correspondingly useful. The section devoted to paint, glass, asbestos, rubber, etc., might have been expanded somewhat to indicate proper and improper uses of various types of these products. As appendices typical tests, specifications and lists isued by the American Society for Testing Materials are appended. It is to be regretted that a glossary and problems have not been added to the book.

Vocational Rehabilitation and Workmen's Compensation.

Bulletin 76, Federal Board for Vocational Education. This valuable public document outlines the interrelation of the federal programs of workmen's vocational rehabilitation and workmen's compensation. It contains a history of the origin of compensation laws and complete information on the interrelation of the compensation and rehabilitation programs of the several states and of the federal government.

Sheet Metal Drafting. By. J. W. Essner. Issued by the State Department of Vocational Education, Little Rock, Ark. A trade extension course covering the essential principles of sheet metal drafting and providing supplementary problems for the use of the student. The course has been prepared to produce the required accuracy and the power to visualize the object drawn.

NOW, ARE THERE ANY QUESTIONS?

This department is intended for subscribers who have problems which trouble them. The editors will reply to questions, which they feel they can answer, and to other questions they will obtain replies from competent authorities. Letters must invariably be signed with full name of inquirer. All questions are numbered in the order of their receipt. If an answer is desired by mail, a stamped envelope should be enclosed. The privilege of printing any reply is reserved. Address, Industrial-Arts Magazine, Milwaukee, Wis.

Mahogany Finish on Birch.

307. Q:—I have a dining room table made of birch. At present it has a finish of dark mahogany (Johnson's Wood Dye) which raised the grain and was then treated to two coats of linseed oil boiled, two parts, turpentine one part. It shows every spot. Where water touched it, it didn't looked varnished, had a dull finish, but with use brightened up a little. Any suggestions you can give will be appreciated.—K. B.

A:—Probably the best results at this time may be secured by following the directions given herewith in order to produce a tough and satisfactory finish for your dining room table. First, wash over the entire table top with a rag and denatured alcohol, in order to remove any traces of grease, etc. If this is carefully done, it will also produce an even shading of the color and thereby avoid the necessity of restaining. The surface should be allowed to dry at least twenty-four hours and may then be filled with a very thin filler prepared as directed in the June number of the INDUSTRIAL-ARTS MAGAZINE. The filler should be tinted with Van Dyke brown and Rose Lake ground in oil in order to produce a rich red chocolate brown. Extreme care should be exercised to see that all excess color is thoroughly removed, using a soft clean cloth for this operation. Allow the filler to dry forty-eight hours in a warm room at 75° F. If necessary sand lightly with a 000000 paper which has been split. After dusting off brush on a thin coat of Pratt & Lambert No. 61 floor varnish and let dry one week. Sand this coat with a split paper and after dusting off thoroughly repeat the varnish coat. Let dry as before, sand and revarnish. The third coat should be well rubbed out with felt pad, FF pumice stone and water to a true surface and may then be cleaned up with a good polish. It should be allowed to dry three or four days before being used. It is advisable to avoid the use of table pads and cloths as experience has shown that this practice injures the finish by causing sweating and consequent softening of the varnish. The use of doilies or table runners and a consequent open table surface is to be encouraged if the finish is to endure.—**Ralph G. Waring.**

Refinishing an Antique Mahogany Bureau.

308. Q:—Will you please tell me how to refinish an antique mahogany bureau?—C. C. S.

A:—First, remove all old varnish and finish by either scraping and sandpapering or by using varnish remover. In case the latter is used, all work from which the varnish has been removed should be sponged and rubbed very freely with denatured alcohol in order to draw off the last traces of varnish remover. In case veneer patches are necessary, these should be applied as soon as the base wood has been scored or cut to a clean surface with a sharp chisel. Do not attempt to glue veneer to anything but a freshly prepared surface. A hot flat iron rubbed over a piece of paper laid on a veneer patch will appreciably speed up the work. The iron, however, should not be much hotter than can be held comfortably on the hand. The entire surface should now be sandpapered with 00 paper to a perfectly true surface and the new patches should be touched up with a full strength solution of mahogany water stain and when dry should be lightly sandpapered. The work should now be restrained entirely with a quarter or half strength solution in order to even up the tone of the whole piece. When dry and without sanding the piece should be given a sizing coat only of orange shellac tinted slightly with Bismark brown alcohol soluble color in order to avoid the usual gray cast found on some mahoganies. When this is dried hard, the shellac coat should them be sanded with split 6/0 paper until the entire surface is glass smooth. A rich chocolate brown filler should now be prepared as directed in the June issue of the INDUSTRIAL-ARTS MAGAZINE and should be tinted to a warm shade with Van Dyke brown, burnt umber and Rose Lake in oil. The filler should dry at least forty-eight hours and then be followed by a good grade of floor varnish as Pratt & Lambert's No. 61, or Boston Varnish Co.'s Kyanize Floor finish. The work should be done in a room heated to about 80° F. and the varnish can best be applied with a Fitch flowing varnish brush about 2½" in width. If it is necessary, however, to work in a cool room, a 2½" black China bristle varnish brush will be found more suitable as the varnish will appear to be quite stiff. Long experience has proved that it is impractical to use a rubbing varnish underbody and a finishing varnish last coat. Although this practice is still followed to some extent in the piano trade, yet silking and cracking invariably results. This can be readily avoided by using a durable but hard drying varnish throughout the entire finish. The last coat of varnish should be rubbed with FF pumice stone, felt pad and water and if it is desired, to give an extra polish with rotten stone, the work should be set aside one day between the pumice stone and rotten stone rubbing. After thoroughly washing off all rotten stone, the piece should be carefully cleaned up with a good polish. Avoid placing any toilet articles on the linen cover for at least two weeks, otherwise an imprint of the cloth will result in the varnished top.—**Ralph G. Waring.**

Finish for Rustic Furniture.

310. Q:—Please suggest a finish for rustic furniture which will keep the bark from dropping away from the branches after they have dried out. The wood which I have at hand is cotton, aspen and iron wood.—M. B. M.

A:—It is unfortunate that you find it necessary to use cotton, aspen and iron woods for making your rustic furniture. These are extremely sappy woods in which there is little adhesion between the bark and the wood. Woods like shag bark, hickory or swamp cedars carry very little sap and therefore the bark adheres more closely for which reason these woods are used almost entirely for the commercial rustic furniture.

The only possible suggestion which may be of value would be to brush on one or two coats of outside spar varnish which has been thinned one-half with turpentine. Allow at least two weeks between coats. This will prevent the excessive drying out of the bark and still avoid the glossy effect which such a varnish is apt to produce. It is also suggested that some care be exercised to prevent the furniture from being exposed to the sun. It is this alternate shrinking and swelling which eventually causes the bark to peel off from the furniture.—**Ralph G. Waring.**

PUBLICATIONS RECEIVED.

Report of Conference on Improving Foremanship, at the Everett Pulp and Paper Co., Everett, Wash. Conducted by Mr. George Henry Jensen, under the auspices of the state board of vocational education and the Everett Pulp and Paper Co. The report is printed and will be distributed by the Everett Pulp and Paper Co. The conference is one of a series carried on by the state board of vocational education as a means of promoting industrial efficiency through vocational education. The work was conducted on the conference plan and the report includes only what was actually worked out and done in the conference. The report discusses the foreman's place in the development of industry, the foreman's job, departmental and job analysis, responsibility analysis and supervisory value of a job, cost elements on stock in storage, keeping up morale, safety and the physical condition of the working force, giving orders, directions and suggestions, and an explanation of the work in trade and industrial education as participated in and promoted by the state board.

The Care of Leather. F. P. Veitch, H. P. Holman and R. W. Frey, of the leather and paper laboratory, U. S. Bureau of Chemistry. Bulletin 1183, U. S. Department of Agriculture, Washington, D. C. The bulletin contains suggestions for a judicious selection of articles made from leather and tells how to care for them in order to obtain the maximum service. The pamphlet contains material on boots and shoes, harness, driving belts, bookbinding leather, and the selection and care of miscellaneous leather goods.